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ABSTRACT

The Vocational and Occupational Interest Choice Examination (VOICE) was designed to measure the interests of enlisted men entering the Air Force. Items forming the inventory were primarily generated by examining job analysis in relation to the airman classification structure. The purpose of this effort was to develop and validate a prototype of an interest inventory that could be used by recruiters with the Guaranteed Enlistment Program. Both a priori and eight occupational scales were developed based on responses obtained by mail inventory administration of airmen who indicated satisfaction with their career fields. Scales were developed on half-samples, and a cross-validation technique employed. A comparison was made, in order to assess validity, of the number of individuals correctly predicted to be members of a service career field or "men-in-general" using the scales versus the number of individuals one would expect to correctly predict without use of the scales. Scale weights developed in one half-sample were applied to responses obtained in the other half-sample in the above comparison. Recommendations for further developmental effort were made. (Author/RC)

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AFHRL-TR-73-38

AIR FORCE HUMAN RESOURCES LABORATORY

DEVELOPMENT AND VALIDITY OF A VOCATIONAL AND OCCUPATIONAL INTEREST INVENTORY

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December 1973

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Between January and April, 1973, over 3,100 airmen in eight service career fields with at least six months on-the-job experience and 300 recruits in basic training returned interest inventories, termed the Vocational and Occupational Interest Choice Examination (VOICE). This interest inventory was designed to measure the vocational interests of enlisted men entering the Air Force. Items forming the inventory were primarily generated by examining job analyses in relation to the airman classification

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structure. The purpose of this effort was to develop and validate a prototype of an interest inventory that could be used by recruiters with the Guaranteed Enlistment Program. Both a priori and occupational scales were developed based on responses obtained by mail inventory administration of airmen who indicated satisfaction with their career fields. Scales were developed on half-samples and a cross-validation technique employed. A comparison was made, in order to assess validity, of the number of individuals correctly predicted to be members of a service career field or "men-in-general" using the scales versus the number of individuals one would expect to correctly predict without use of the scales. Scale weights developed in one half-sample were applied to responses obtained in the other half-sample in the above comparison. Recommendations for further developmental effort were made.

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SECTION I

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Introduction

With the advent of an all-volunteer recruitment policy, the United States Air Force is replacing automated assignment of enlisted recruits to career fields with a guaranteed assignment program. Until recently, the majority of Air Force enlistees have been assigned to career fields by a computer assignment system. Early in basic training they were given an overview and audio-visual presentation of the fields available to them and asked to indicate their choices. The assignments, made by computer at the conclusion of basic training, used variables such as the number of persons needed in each field and the preferences expressed by the enlistees.

In 1971, USAF recruiters began offering, prior to enlistment, guaranteed assignment in any one of 26 Air Force career fields. Since then, the program has expanded so that now, in 1973, there are approximately 132 career fields from which an enlistee may choose.

Should this program expand even further, the responsibilities traditionally assumed by recruiters would be altered considerably. In addition to promoting the Air Force as a career, recruiters would be placed in the role of vocational counselors, guiding recruits to potentially far-reaching commitments. The implications for reenlistment are obvious.

However, to guide men into rewarding careers, the recruiters will need either a much broader background in counseling than most of them now have or effective devices for measuring the vocational interests of recruits. Vocational interest inventories, or questionnaires, are used extensively for this purpose by high school and college counselors. Unfortunately they are not appropriate for Air Force personnel. The questions, or items, do not reflect the nature of the activities of an enlisted man on duty. Furthermore, degree-of-job-satisfaction is not a factor in the interest scales, or scores, of the inventories used in schools and colleges. These scales reflect either the respondent's membership in an occupational group or his response to groups of homogeneous items.

The Air Force needs a vocational-interest inventory for use in conjunction with their aptitudinal selection measures. The inventory should be designed specifically for Air Force recruiters who are administering a guaranteed assignment program. This report describes the initial stages of the development of such an instrument called the Vocational and Occupational Interest Choice Examination (VOICE).

A Brief Review of Vocational Interest Measures

Vocational interest measurement has one of the oldest and most successful records in the history of psychological testing. Two

excellent summaries and evaluations of the published inventories can be found in Buros (1965) and Robinson, Athanasiou, and Head (1969). Much of this section is based upon Chapter 13 of Robinson et al, where concise evaluations of 13 interest inventories, also reviewed in Buros, are presented in addition to a review of one developed since Buros' publication. In this section, some of the difficulties and shortcomings of many interest inventories that render their use by the Air Force inappropriate are enumerated. The aim is not to unjustly criticize these inventories, because many of them, especially the Strong and Kuder, have been used with considerable success in guidance programs but to explain why VOICE was developed for the Air Force's recruiting programs.

The Strong Vocational Interest Blank is one of the most highly regarded and well-researched inventories available. However, it has some psychometric problems, such as out-of-date norms and possible response set. Although the scale authors are continually making improvements, there is one problem that renders the Strong inapplicable for the Air Force; almost all the items and scales refer to occupations at the top fifth of the occupational status hierarchy. Very few refer to nonprofessional occupations, which largely make up the choices available to the enlisted man. Furthermore, the number of scales (112 on one form) makes interpreting a profile complex; and scoring the scales by hand is a tedious process, although a computerized scoring system could minimize this problem.

The Kuder Preference Record--Occupational and Vocational are two highly rated and frequently used inventories. The occupational form was designed to compete with the Strong. The chief criticism of the Kuder forms has been against the interpretations of results based on the forced choice method of responding. Buros points out the difficulties of interpreting results in either a normative or an ipsitive mode. It is believed that recruiters would have considerable difficulty making accurate and useful interpretations with either form.

One recently published inventory which might have been considered for use by the Air Force is the Minnesota Vocational Interest Inventory. This inventory was designed to measure the nonprofessional occupational interests of men who enlist in the Navy. Development of the Minnesota Inventory, funded by the Office of Naval Research, began in 1946. In its evolution, the inventory moved from a military setting to a nonprofessional civilian setting. The item format is the same as that used by the Kuder and suffers from the same limitations created by the use of the forced choice format. Both occupational and homogeneous scales are presented. Buros does not review the Minnesota Inventory, but Robinson et al give it very favorable treatment.

The Gordon Occupational Checklist was also designed for use in measuring nonprofessional vocational interests. It has been criticized because scores are given on a priori scales, with only an afterthought

for item analysis. Also, there is some difficulty with the definitions of the scales, as well as with the underlying factor structure.

Other inventories that could be considered are the Picture Interest Inventory, Guilford-Zimmerman Interest Inventory, How-Well-Do-You-Know-Your-Interests, Geist Picture Interest Inventory, Curtis Interest Scale, Fowler-Permeuter Interest Record, Career-Finder, and Qualifications Record. All of them have numerous shortcomings: most frequently poor item construction and analysis, potential response set, statistical problems, and psychometric inadequacies of reliability, homogeneity, discrimination, and cross-validation.

SECTION II

Development of Instruments

Career Field Selection

Eight career fields were selected to serve as a basis for developing the interest inventory. Each career field was in the guaranteed assignment program as of 1 May 1972, had a high inward flow of personnel, and was selected so that it represented two career fields from each aptitude index of the Airman Qualifying Examination (AQE)--Mechanical, Administrative, Electronics, and General. (The Airman Qualifying Examination was the operational selection and classification instrument used by the Air Force during the time period of the contract.)

Since it was desirable to select from each AQE aptitude index area one career field with a requirement of a high and one career field with a low selector aptitude index all career fields with selector aptitude indexes of at least 80 in Electronics, 60 in General and Administrative, and 50 in Mechanical areas were reviewed along with career fields requiring a selector aptitude index of 40 or less in Administrative, General, and Mechanical and 50 or less in Electronics.

From each group, career fields with the largest Ns were selected for consideration. Brief descriptions of these fields were examined and on the basis of the magnitude of N, similarity, and judgement, the eight career fields given in Table 1 were selected.

AQE score distributions for each aptitude type and job classification in each field were requested so the fields could be compared for overlap in AQE scores. No significant overlap was found for career fields in the same area.

Development of VOICE

Construction of the interest scales began with an inventory of the ETS test collection and a review of all relevant occupational interest inventories. From these sources an item pool of 400 occupational interest items were written. It was decided to assign related items to separate interest scales or groups, for scoring purposes, for example, mechanical, computational, clerical and so forth. An a priori scale approach was planned for two reasons. First, the significance of response to single items is not very reliable. Second, the scale definitions would provide guidelines for writing items if alternate or parallel forms of the inventory were needed. Since occupational scales were to be developed, a pool of miscellaneous items was also written.

The items were based on two principal criteria: (1) each item would be assigned to one of 14 scales thought to be relevant to Air Force career fields (with the exception of the items assigned to the

Table 1

Eight Career Fields

Aptitude Type	Aptitude Score Required	Minimum Score	AFSC	N	Title
Administrative	High	A80	671X0	1,702	General Accounting Specialist
	Low	A40	702X0	35,571	Administration Specialist
General	High	G80	252X1	3,369	Weather Observer
	Low	G40	811X0	21,074	Security Specialist
Electrical	High	E80	304X0	4,496	Radio Relay Equipment Repairman
	Low	M/E40	421X3	8,533	Aerospace Ground Equipment Repairman
Mechanical	High	M/E50	431X1C	23,583	Maintenance Specialist - Jet Aircraft, 1 & 2 Engine
	Low	M40	473X0	3,773	General Purpose Vehicle Repairman

miscellaneous category) and (2) the language of the items should be appropriate for the probable reading level of recruited Air Force personnel.

Each item presents an activity (e.g., "Tinker with a broken sewing machine") and asks the examinee to indicate whether he likes, dislikes, or is indifferent to the activity. The items were listed singly, not in groups. This format was chosen for its simplicity and efficiency. Zuckerman (1953) showed that individual item arrangement is more efficient than triad arrangement in terms of response time. Perry (1953) conducted another study in which the item pools were of equal size and triads were compared with individual items. Although a slight superiority was shown for the triads, it was not consistent. Items arranged individually also have the advantage of being easier to score.

The scales originally developed resulted from a thorough review of the major occupational interest inventories extant and adaptations of them which were related to the Air Force career fields. In addition, a review of the jobs within the various career fields suggested other scales which had no counterparts in other published inventories.

When the items were being written, two reference sources were used. One was AFM 39-1 which contained specific descriptions of Air Force jobs. The second was the Dictionary of Occupational Titles (DOT) (1969). It was thought that candidates for the Air Force would probably be more familiar with the nonmilitary counterparts of Air Force jobs, so that, where possible, the DOT descriptions of jobs similar to those described in AFM 39-1 were also used as source material.

The final version of the interest inventory consisted of 400 items grouped in four general sections: Occupations (90 items), Work Tasks (210 items), Leisure Activities (70 items), and Desired Learning Experiences (30 items). The final version of the inventory prototype contained 13 separate scales in addition to a pool of miscellaneous items. The scales and the number of items in each scale are listed in Table 2.

Development of Job Satisfaction Scales

Prior to developing a job satisfaction scale, a search was conducted for existing job satisfaction scales and research dealing with them. The 13 scales given by Robinson et al (1969, Chapter 5) were examined in considerable detail. It was concluded that there are several factors that may affect job satisfaction. In general, the factors could be characterized as either extrinsic or intrinsic. In order to include each significant factor, a draft scale of 47 items was developed.

From these items, four job satisfaction scales were developed and titled "Job," "Peer," "Supervision," and "Air Force." The 16-item Job scale was designed to measure intrinsic satisfaction with the actual

Table 2

Final Interest Scales and Items in Each

Scales	Items
Audiographic	18
Food Service	18
Pedagogy	12
M-Scale	20
Leadership	13
Computational	26
Health Service	28
Scientific	34
Electronic	31
Mechanics	40
Clerical	40
Outdoors	33
Academic	49
Miscellaneous	77

work activities. The 10-item Peer scale was designed to measure satisfaction with one's fellow co-workers. The Supervision scale contained 12 items and measured satisfaction with one's supervisor. The Air Force scale was a brief 8-item scale aiming to measure satisfaction with working conditions in the Air Force. Items were written in brief form, often consisting of only one word. Items were also stated in such a way that positive response to some items would indicate satisfaction and to other items dissatisfaction.

The four job satisfaction scales are modifications of scales used in the Job Description Index (JDI) of Locke, Smith and Hulin (1965). An approach similar to that used in the JDI was considered appropriate because of its low verbal level and research indicating that the JDI scales have predictive, convergent, and discriminant validity, as well as internal consistency and stability (Robinson et al, 1969, pp. 105-107).

SECTION III

Field Test

Sample Selection

VOICE was administered in a field test to a sample consisting of 4,800 airmen, 600 from each of the eight selected career fields. To be in the sampling frame for a given career field, an airman needed to have both AQE scores on file and at least six, but not more than 42, months of on-the-job experience. A random sample of personnel within each career field was selected from the airman tape files maintained by the Computational Sciences Division of the Air Force Human Resources Laboratory.

In addition, the following information was obtained and forwarded to Educational Testing Service (ETS) on each participant: his social security account number (SSAN), the Consolidated Base Personnel Office (CBPO) to which he was assigned, his AF speciality code and aptitude scores.

The Role of the CBPO

The participants in the field test were located at 128 CBPOs throughout the world. Each participating CBPO was notified by Headquarters USAF that they would be receiving an approved interest survey which should be distributed to identified personnel. Initial and follow-up mailings to the CBPOs, by the contractor, contained a letter from the Personnel Research Division outlining the project, instructions for survey administration, a roster of the participating airmen, and preaddressed sealed packets for distribution to the men. Each sealed packet contained a VOICE booklet, an answer sheet, an introductory letter, a pencil, and a business reply envelope. The men were told to return their completed VOICE booklets directly to the ETS project directors.

In addition, CBPOs in the continental United States whose bases had a large nonresponse rate were contacted by the Personnel Research Division of the Air Force Human Resources Laboratory. The response rate from those bases that were called increased significantly, particularly from those with large numbers of security specialist nonrespondents.

Collection of the Completed Inventories

As the completed inventories were received, they were checked for accuracy of identification information and omission of data.

Inventories were collected until 3,537 had been returned. Of those returned, 3,104 were found to be useable. Of this total, 3,072 were found to be valid for analysis purposes after detailed scan-edit

procedures. All AFSCs had more than 300 usable returns, which was considered the minimum number required for analysis. A complete tally of the usable and unusable returns by career field and reason for nonuse appear in Table 3.

The response rates achieved for the various CBPOs were also calculated. They were generally high. Of the 128 CBPOs involved, 111 achieved response rates of 60 percent or better. A list of the CBPOs from whom cooperation was requested is given in Table 4 with the number of inventories mailed to the CBPO and the response rate achieved.

Administration to Basic Trainees

In order to obtain a "men-in-general" group, as well as to estimate the test-retest reliability of VOICE, the inventory was administered to a group of airmen who reported for experimental testing during basic training. VOICE was administered to 312 men in their sixth day of training. A sample of 211 from this same group took VOICE again on their twenty-ninth and last day of basic training to attempt to estimate the reliability of VOICE. From this total, 209 valid cases were used as "men-in-general" group. Some of the men from the original group were lost because of discharges, setbacks to other flights, sick call on the test date, and various other reasons. Since it was difficult to know in advance exactly how many airmen would report for testing, every man in each flight was tested until the 200 which the project directors had requested was reached.

Data Transcription and Editing

Useable answer sheets were batched (the unuseable ones were not processed) and the responses transcribed on magnetic tape by means of a special purpose scoring machine called SCRIBE (Scanning, Comparing, Recording Instrument for Better Education). A quality control check indicated that the probability of more than one error per 100,000 transcriptions was less than 0.01. All errors found were corrected.

Data from the SCRIBE file were merged with the file obtained from the Personnel Research Division tape giving Airman Qualifying Examination (AQE) scores for the participating airmen.

Table 3

Test Administration

Useable Returns		Unuseable Returns	
AFSC	Number	Reason	Number
2521	457	Incomplete	121
3040	409	Patterned Responses	22
4213	361	Wrong AFSC Number	51
4311	364	Completed by wrong SSAN	1
4730	346	Answer Sheet Number Unknown	5
6711	467	Returned Blank, no reason	37
7020	385	Claimed One Completed	9
8110	315	Separated or Discharged	86
Total	3104	Transferred or Reassigned	25
		PCS	33
		TDY	11
		AWOL or Deserter Status	4
		Patient Status	2
		Military Confinement	3
		On Leave	1
		Addressee Unknown on Base	22
		Total	433

GRAND TOTAL: 3537

Table 4

Response Rate by CBPO

Code	Base	Sent	Percent Responding	Code	Base	Sent	Percent Responding	Code	Base	Sent	Percent Responding
AF	APO, New York	13	100.00	GF	Goodfellow, TX	6	100.00	RF	APO, New York	43	60.47
AH	APO, New York	36	52.78	GK	APO, New York	9	100.00	RJ	Randolph, TX	20	90.00
AK	Patrick, FL	2	100.00	GM	Grand Forks, ND	81	40.74	RM	Reese, TX	18	83.33
AM	Altus, OK	59	66.10	GW	Griffiss, NY	44	81.82	RP	APO, New York	33	100.00
AU	Andrews, D. C.	47	70.21	HB	APO, New York	29	58.62	RT	Richard, Gebaur, MO	18	94.44
AX	APO, New York	16	87.50	HD	Hamilton, CA	37	86.49	RX	Robins, GA	98	75.51
AY	APO, New York	18	88.89	HF	Hancock, NY	38	65.79	SA	USAFPCS, VA	24	91.67
BB	Barksdale, LA	5	100.00	HH	Pentagon, D. C.	1	0.00	SJ	APO, New York	65	78.46
BD	Beale, CA	56	62.50	HI	APO, San Francisco	5	60.00	SM	Seymour Johnson, NC	58	46.55
BF	APO, New York	41	85.37	HL	APO, San Francisco	48	91.67	SP	Shaw, SC	88	79.55
BH	Bergstrom, TX	117	95.73	HP	Hill, UT	19	84.21	SQ	Sheppard, TX	37	89.19
BL	APO, New York	43	76.74	HS	Holloman, NM	61	55.74	MT	Moody, GA	13	100.00
BN	Blytheville, AR	27	70.37	HV	Homestead, FL	82	69.51	MU	McClellen, CA	16	81.25
BP	Bolling, D. C.	22	72.73	KB	APO, San Francisco	69	57.97	NJ	Nellis, NV	92	63.04
BV	Brooks, TX	5	100.00	KF	Keesler, MS	76	84.21	OD	Offutt, NE	113	80.53
BX	Grissom, IN	22	68.18	KH	Kelly, TX	8	100.00	OP	APO, Seattle	65	47.69
CC	APO, New York	8	75.00	KJ	Kelly, TX	3	66.67	PE	APO, New York	4	100.00
CD	Cannon, NM	77	68.83	KL	Kelly, TX	10	70.00	PF	Patrick, FL	14	100.00
CF	Carswell, TX	28	75.00	KM	Kincheloe, MI	26	34.62	PJ	Pease, NH	56	64.29
CH	Castle, CA	30	40.00	KU	APO, San Francisco	27	48.15	PS	Plattsburgh, NY	50	76.00
CK	Chanute, IL	46	91.30	KV	Kirkland, NM	25	88.00	ST	APO, New York	26	96.15
CO	Columbus, MO	32	68.75	KY	Sawyer, MI	58	63.79	TE	Tinker, OK	169	66.27
CZ	Craig, AL	24	95.83	LJ	Lackland, TX	26	65.38	TJ	APO, New York	42	69.05
DF	Davis, MO	75	90.67	LK	Hanscom, MA	17	76.47	TX	Tyndall, FL	29	65.52
DM	Dover, DE	40	85.00	LP	Little Rock, AR	36	63.89	UP	APO, New York	52	63.46
DT	Duluth Airport, MN	20	75.00	LQ	Lockbourne, OH	16	75.00	US	AF Academy, CO	6	100.00
DW	Dyess, TX	38	63.16	LS	Loring, ME	54	62.96	VH	Vance, OK	8	87.50
EB	Edwardo, CA	33	75.76	LU	Los Angeles, CA	2	100.00	VQ	Vandenberg, CA	17	100.00
ED	Elgin, FL	66	95.45	LW	Lowry, CO	21	57.14	WE	Wright Patterson, OH	24	79.17
EE	Elgin Auxillary, FL	32	84.38	LY	Luke, AZ	61	70.49	WG	Forrestal Bldg, D. C.	10	50.00
EH	APO, Seattle	30	100.00	MA	Macdill, FL	72	69.44	WM	Webb, TX	20	65.00
EJ	Ellsworth, SD	72	83.33	MB	Malmstrom, MT	73	75.34	WP	Westover, MA	36	86.11
EL	APO, Seattle	89	78.65	MD	March, CA	9	100.00	WT	Whiteman, MO	41	80.49
EM	England, LA	36	50.00	ME	Mather, CA	17	70.59	WU	APO, New York	21	80.95
EP	Peterson, CO	30	90.00	MG	Maxwell, AL	23	73.91	WV	Williams, AZ	30	100.00
ER	APO, Seattle	1	100.00	MK	McConnell, KS	28	67.86	WZ	Wurtsmith, MI	47	68.09
FC	Fairchild, WA	39	71.79	ML	APO, New York	11	90.91	YM	APO, San Francisco	48	100.00
FJ	Forbes, DS	44	40.91	MM	McCoy, FL	21	61.90	MN	McGuire, NJ	47	65.96
FT	Ft. George G. Meade, MD	6	100.00	WY	Wright Patterson, OH	2	50.00	MP	Minot, ND	64	78.13
FW	F. E. Warren, WY	62	56.45	PV	Pope, NC	47	76.60	MW	Mountain Home, ID	42	83.33
GB	George, CA	72	63.89	RC	APO, New York	13	76.92	MY	Myrtle Beach, SC	62	69.35
									TOTAL	4800	73.52

SECTION IV

Statistical Analysis

Construction of Half-Samples

Prior to analyzing job satisfaction data and developing scales, two half-samples were constructed. All airmen were grouped according to their career fields. Within each of the eight fields, each airman was ranked by his total AQE score. The total AQE score was the sum of the four normal deviates corresponding to the percentile scores usually reported for the scale. As a final step, each pair of airmen (in rank order) within each career field was considered and one of the two randomly assigned to Sample 1, the other to Sample 2. The result of this procedure was the formation of two half-samples of airmen in each of the eight career fields. The total AQE score was equal in expectation for half-samples in the same career field. The recruits forming the men-in-general group were also randomly divided. (This was a simple random division since no AQE scores were available for this group). Except where indicated, all of the analyses described were performed twice, once for each half-sample.

Item Selection for A Priori Interest Scales

To achieve more efficient scoring and eliminate heterogeneous items, a backward selection procedure was used to reduce the number of items forming an a priori scale. All a priori scales were limited to a maximum of 16 items. In the case of scales with fewer than 16 items, the only items eliminated were those with negative correlations with the total scale score. The decision to use 16 items was based on the findings of Katz, Norris, and Halpern (1970), who achieved internal consistencies above 0.90 for interest items in eleven of twelve interest scales, using a similar item response format.

Identical procedures were used independently with each half-sample and, subsequently, the combined sample, to select items for the recommended a priori scales. The procedure is summarized below:

1. Compute the correlation between each item in the pool assigned to a scale and the total score based on the remaining items in the same pool. Items were scored on the basis of 1 = dislike, 2 = indifferent, 3 = like and each item was given an equal weight in computing the total scale score.

2. Select the item with the lowest item-total correlation and discard that item.

3. Rescore the scale total, eliminating the item identified in the previous step. Recompute new item-total correlations.

4. Repeat steps 2 and 3 until 16 items remain.

5. Eliminate items with negative item-total correlations if fewer than 16 items were in the scale item pool.

This process illustrates the logic of the scale construction. If this strategy were implemented on the computer, the several rescorings would be time consuming and expensive. Identical results can be obtained by manipulating the variance-covariance matrix of items. For each item p, the correlation with the total score based on the remaining items was computed by

$$r_p(t.p) = \left(\sum_{\substack{d=1 \\ d\neq p}}^{k} S_{pj}\right) \Big/ \left(\left(\sum_{\substack{i=1 \\ i\neq p}}^{k} \sum_{\substack{d=1 \\ j\neq p}}^{k} S_{ij}\right)(S_{pp})\right)^{1/2} \qquad (1)$$

The quantity $r_p(t.p)$ indicates the correlation of interest. The notation $(t.p)$ has been used in the subscript to show that the pth item has been removed from the total. The number of items is denoted by k, and the covariance of items i and j is denoted by S_{ij}.

When the pth item was identified as having the lowest item-total correlation, correlations were formed by calculating

$$r_{p'}(t.pp') = \left(\sum_{\substack{d=1 \\ d\neq p \\ d\neq p'}}^{k} S_{p'j}\right) \Big/ \left(\left(\sum_{\substack{i=1 \\ i\neq p \\ i\neq p'}}^{k} \sum_{\substack{d=1 \\ d\neq p \\ d\neq p'}}^{k} S_{ij}\right)(S_{p'p})\right)^{1/2} \qquad (2)$$

and the pth item with the lowest value of $r_{p'}(t.pp')$ was dropped. This process was continued until 16 items remained.

The process just described was designed to achieve a high degree of homogeneity among scale items. Internal consistency coefficients (coefficient alpha) were computed for each scale after item selection as follows:

$$\alpha = \frac{k}{k-1}\left[1 - \sum_{i}^{k} s_i^2/s_t^2\right] \qquad (3)$$

where k represents the number of items in the scale, s_i^2 the item variance, and s_t^2 the total scale variance for the k items. Whenever internal consistencies were calculated, as in the occupational keys and the job satisfaction scales, the same method was used.

Identifying Satisfied and Dissatisfied Personnel

A two-phase plan was initiated to assign individuals in each career field to satisfied and dissatisfied groups. First, within each field, satisfied and dissatisfied groups were formed according to their responses to the overall job satisfaction question. This item asked respondents to indicate their satisfaction with their Air Force job on a four point scale ranging from very satisfied to very dissatisfied. Personnel responding "very satisfied" or "moderately satisfied" were classed in the satisfied group, and those "moderately dissatisfied" or "very dissatisfied" were classed in the dissatisfied group. Second, a stepwise regression analysis (Draper and Smith, 1966, p. 171) was performed within each field to find the linear function of the four satisfaction scores which best separated the satisfied from the dissatisfied personnel. This linear function was then used to rank all personnel within a career field in terms of "satisfaction." The first N_s subjects with the highest scores were chosen as the satisfied group where N_s corresponded to the number of subjects indicating overall satisfaction. This resulted in the proportions of satisfied and dissatisfied personnel within each field being the same as those estimated from the overall question.

Determining Occupational Scales

Within each career field the zero order correlations between each interest item and a dichotomous criterion were computed. The dichotomous criterion was scored 1 if the subject was a member of the satisfied career field group and 0 for the comparison group, which was always men-in-general. The 50 items having the highest correlations (regardless of sign) with the group membership criterion were selected from the 400 items. These 50 items served as independent variables in a stepwise regression analysis with the dichotomous criterion. This procedure was equivalent to a stepwise discriminant analysis for the two-group case (Beaton, 1964) and served the purpose of selecting a final set of items. Items were added until the increment in the squared multiple correlation was less than 0.0025. The variables added up to this point constituted the occupational scale with unit weights, the weights arrived at through the stepwise regression analysis were retained for comparative purposes. It was necessary to reduce the search for items to comprise these scales from 400 to 50, because 400 independent variables is too large for most stepwise regression computer programs. Also, scales consisting of as few items as possible make scoring easier. It was believed that 50 items would provide a manageable pool and be large enough to produce occupational scales of sufficient quality.

Predicting Criterion Groups with A Priori Scales

A similar procedure was used to arrive at the best linear function of a priori scale scores for separating each group of satisfied personnel from men-in-general within each career field. A stepwise regression analysis was performed, using the dichotomous criterion representing group membership. Scales adding at least 0.0025 to the squared multiple correlation were retained.

Multiple Group Discriminant Analysis

Using the 13 final a priori scale scores, a 16 group discriminant analysis (Cooley and Lohnes, 1962, Chapter 6) was performed on the eight satisfied and eight dissatisfied career groups. A similar sixteen-group analysis was also performed using the occupational scales. The purpose of the discriminant analysis was, in part, to further validate the scales but also to check the positions of the various groups in the discriminant space. For example, the analysis would determine the proximity of the two groups from a similar career field in relation to groups from other career fields. Evidence of this nature would provide supplementary evidence as to the validity and usefulness of the scales developed.

Cross-Validation

The scoring weights derived from the series of stepwise regression analyses in one half-sample were applied to the data in the other half-sample. Within each field the appropriate occupational scale score or linear function of a priori scales was used to predict whether the subject was classified as a member of the satisfied group or of the men-in-general group. Dissatisfied personnel were not included in the cross-validation. Classification rules which minimized the probability of misclassification were developed for each career.

For each individual, the probability of membership in one of the two groups could be computed according to the formula (Cooley and Lohnes, 1962, p. 138):

$$P_{ij}\ [H_j|Y_i] = \left[\frac{p_j}{s_j} e^{\frac{-[y_j - \bar{y}_j]^2}{2s_j^2}}\right] \Bigg/ \left[\sum_k \frac{p_k}{s_k} e^{\frac{-[y_k - \bar{y}_k]^2}{2s_k^2}}\right] \qquad (4)$$

where $P[H_j|Y_i]$ indicates the probability that the ith person with scores y_i on the derived linear function of items or scales belongs to group H_j. In this case, there are two groups H_1 and H_2. The p_j is the proportion of satisfied personnel obtained in the cross-validation sample; the s_j is the estimate of the standard deviation of the linear function or score estimated from the analysis sample.

By taking the logarithm of the numerator of the quantity of the right side of the equation and substituting the sample quantities, the following classification rule is obtained:

$$C = \left[\log \frac{N_c}{NS_c} - \frac{(y - \bar{y}_c)^2}{2s_c^2}\right] - \left[\log \frac{N_m}{NS_m} - \frac{(y_1 - \bar{y}_m)^2}{2s_m^2}\right] \quad (5)$$

where N_c is the number of subjects classified as satisfied in a given career group in Sample 2; N_m is the number of subjects in the men-in-general group in Sample 2; $N = N_c + N_m$; S_c and S_m are the standard deviations of Y estimated for the given career group and the men-in-general group, respectively, in Sample 1; $\bar{Y}_c$ and $\bar{Y}_m$ are the estimated means of the function Y in Sample 1 for the career group and men-in-general group, respectively.

If $C \geq 0$, a subject was classified in the career group. If $C < 0$, the subject was classified in the men-in-general group.

Hits and Misses were computed as follows:

1. If $C \geq 0$ and the subject was in the career group, classify as a career hit.
2. If $C < 0$ and the subject was in the career group, classify as a career miss.
3. If $C \geq 0$ and the subject was in the men-in-general group, classify as a men-in-general miss.
4. If $C < 0$ and the subject was in the men-in-general group, classify as a men-in-general hit.

For the occupational scales, the proportions of hits (correct classifications) obtained with unit weighting were compared with the proportions of hits obtained using the exact weights estimated in the discriminant analysis. For the a priori scales, weights rounded off to integer values were compared to the exact weights.

Obtaining Final Estimates

Once the cross-validation was completed, data from the two half-samples were recombined and final scales were derived on the basis of all the data. This is, the steps performed for each half-sample were carried out for the entire sample. Satisfied and dissatisfied groups were defined, items for the a priori scales were selected, and occupational scales were developed using the entire sample of satisfied airmen within a career field as the criterion group and the entire men-in-general sample as the reference group. A final set of linear functions of the a priori scales were also developed in this way. The cross-validity estimates can be regarded, then, as lower bound estimates for the error in the classification rules based on the entire sample, since they are based on only half the data.

In addition, all means, standard deviations, and intercorrelations were computed for the final scales, and test-retest correlations for all scales were computed on a subsample of 209 men-in-general.

SECTION V

Results

Characteristics of the Job Satisfaction Scales

The four job satisfaction scales, Job, Peer, Supervision, and Air Force, appear to possess a sufficient degree of reliability and some discriminant validity, as can be seen in Table 5. This table gives the correlations between the four job satisfaction scales, as well as the correlation between the satisfaction scales and the single, overall job satisfaction item. The estimates of internal consistency have been placed in parentheses.

The estimates of internal consistency for the Job and Supervision scales were comparable to those reported for Smith's JDI (Robinson et al, 1969, pp. 105-106), which were in excess of 0.80 for her five scales. Internal consistencies for the Peer and Air Force scales were considerably below that standard. Although the Air Force scale had only eight items and the lowest internal consistency, the Supervision scale had the highest internal consistency, even though the Job scale had more items.

Judging from the magnitude of the correlations between scales, the four scales do not appear to be statistically independent. This result was also reported for the JDI. However, the high correlation reported for the JDI between Work and People was not found between the VOICE scales for Job and Peer, even though the two pairs of scales are similar. These positive correlations indicate that the VOICE job satisfaction scales may be measuring a general job satisfaction factor to a large extent.

The four correlations between each of the scales and the single, overall job satisfaction item indicate that each scale is positively associated with overall satisfaction. However, satisfaction with the intrinsic nature of the work activities which a career entails, as reflected in the Job scale, is of major importance.

Development of Rules for Classifying Satisfied Personnel

Table 6 shows the multiple correlations for the total sample between scores on the job satisfaction scales and the single overall-satisfaction question. Within the eight careers the correlations ranged from 0.68 to 0.60. The standardized regression weights for the four scales indicate, with a high degree of consistency, that the score on the Job scale is of paramount importance in predicting how an airman responds to the overall job satisfaction question. When t-tests of the significance of standardized regression weights are performed, they show that in most instances the contributions of the remaining scales were not significant. Inspection of Table 6 also

Table 5

Satisfaction Scale Reliabilities[a]
And Intercorrelations

Scale	Job	Peer	Supervision	Air Force	Overall
Job	(.840)	.348	.466	.454	.722
Peer		(.742)	.476	.351	.260
Supervision			(.884)	.379	.343
Air Force				(.597)	.373

[a]Internal consistency coefficients are shown in parentheses. The correlations were based on the total sample of 3,072 airmen.

Table 6

Standard Regression Weights and Multiple Correlations for Four Satisfaction Scales Used to Predict Satisfied Versus Dissatisfied Personnel Within Career[a]

TOTAL SAMPLE

Career	Job	Peer	Supervisor	Air Force	Multiple r
Weather Observer	.6691[b] (.0406)	-.0512 (-.0061)	.0149 (.0009)	.0532 (.0064)	.6840[b]
Radio Relay Repairman	.6494[b] (.0419)	-.0512 (.0058)	-.0056 (-.0004)	.0696 (.0086)	.6697[b]
Ground Equipment Repairman	.5992[b] (.0381)	-.0987[b] (-.0107)	.0072 (.0004)	.1000[b] (.0124)	.6181[b]
Aircraft Maintenance	.5866[b] (.0409)	-.0156 (-.0018)	.0601 (.0037)	.0062 (.0007)	.6128[b]
Vehicle Repairman	.5865[b] (.0363)	.1052[b] (.0111)	-.0262 (-.0016)	.0235 (.0027)	.6268[b]
Accounting Specialist	.6236[b] (.0380)	-.0511 (-.0054)	-.0395 (-.0024)	.1425[b] (.0169)	.6627[b]
Administration Specialist	.6497[b] (.0410)	.0209 (.0020)	-.0696 (.0048)	-.0114 (-.0013)	.6315[b]
Security Specialist	.6150[b] (.0368)	.0329 (.0029)	-.0155 (-.0008)	-.0272 (-.0027)	.6010[b]

[a] Raw score regression weights shown in parentheses.

[b] Significantly different from zero at .01 level.

reveals that the regression systems for the eight careers were highly similar (in that weights for Job were high), though the proportions of satisfied personnel differed within each field. Table 7 shows the regression weights and multiple correlations for the half-samples.

Total job satisfaction scores for each career field were generated using these regression systems. Groups of satisfied and dissatisfied personnel were distinguished by cutting scores determined by the proportions of satisfied and dissatisfied responses to the overall satisfaction question. Table 8 shows the numbers of satisfied and dissatisfied personnel in each career, along with the proportion of men in each field who were satisfied with their jobs.

Since only satisfied personnel were to be used in developing scales, a desirable outcome would have been for substantial numbers of men within each career to have indicated satisfaction with their work. Unfortunately, in five of the eight careers fewer than half the men indicated satisfaction with their jobs. Within Security Specialist only 24.4 percent were satisfied, which reduced the total sample of satisfied personnel within this field to 43 in Sample 1 and 32 in Sample 2. This suggests that an initial screening to identify satisfied personnel might have been useful. VOICE could have been administered to airmen identified as satisfied and to a sample of those who were dissatisfied.

Selection of Items for the A Priori Scales

The items for the VOICE a priori scales were selected independently for each half-sample, according to the statistical procedures described earlier. Since the objective was to construct homogeneous scales, the responses of every airman with a valid AFSC were used to choose the scale items regardless of the degree of job satisfaction the men expressed. The resulting sample sizes were 1,537 for Sample 1 and 1,535 for Sample 2.

The items selected in the half-samples were relatively consistent. In six of the thirteen scales, identical items were chosen. Five scales had fewer than four items that were unique for half-samples. Only the Scientific and Outdoor scales were substantially different.

The differences in the Scientific scales of the two samples can probably be attributed to their orientation. The eleven items unique to the Sample 1 scale can be associated with academic activities; for example, reading about great scientists and studying astronomy, chemistry, meteorology, microscopes, nuclear reactions, physics, and radiation belts. These are all activities and courses likely to take place in schools and colleges. On the other hand, the items unique to Sample 2 represent a technical and operational orientation--performing experiments, determining concentrations, helping scientists, devising special equipment, determining the age of foods, keeping records, classifying rocks, and using microscopes.

Table 7

Standard Regression Weights and Multiple Correlations for Four Satisfaction Scales Used to Predict Satisfied Versus Dissatisfied Personnel Within Career[a]

SAMPLE 1

Career	Job	Peer	Supervisor	Air Force	Multiple r
Weather Observer	.7109(.0422)	-.1147(-.0133)	.0060(.0004)	.0467(.0467)	.6914
Radio Relay Repairman	.6445(.0418)	-.0576(-.0062)	.0006(.0000)	.0950(.0112)	.6793
Ground Equipment Repairman	.5615(.0381)	-.0905(-.0102)	.0065(.0004)	.1289(.0160)	.6049
Aircraft Maintenance	.5850(.0411)	.0129(.0015)	.0774(.0048)	-.0196(-.0024)	.6242
Vehicle Repairman	.6187(.0394)	.0180(.0019)	-.0225(-.0013)	.0651(.0077)	.6424
Accounting Specialist	.5546(.0347)	-.0288(-.0030)	.0607(.0038)	.1356(.0155)	.6540
Administration Specialist	.6015(.0382)	.0180(.0016)	-.0136(-.0009)	-.0274(-.0032)	.5912
Security Specialist	.6480(.0400)	.0493(.0044)	.0360(.0019)	-.1302(-.0130)	.6322

SAMPLE 2

Career	Job	Peer	Supervisor	Air Force	Multiple r
Weather Observer	.6317(.0394)	.0176(.0022)	.0089(.0006)	.0643(.0076)	.6809
Radio Relay Repairman	.6558(.0421)	-.0561(-.0068)	-.0053(-.0004)	.0419(.0054)	.6607
Ground Equipment Repairman	.6293(.0378)	-.1050(-.0111)	.0286(.0017)	.0666(.0083)	.6333
Aircraft Maintenance	.5838(.0405)	-.0559(-.0066)	.0358(.0021)	.0482(.0057)	.6037
Vehicle Repairman	.5763(.0348)	-.1905(-.0199)	-.0467(-.0029)	-.0199(-.0022)	.6236
Accounting Specialist	.6816(.0405)	-.0670(-.0071)	-.1267(-.0077)	.1322(.0163)	.6831
Administration Specialist	.6887(.0432)	.0080(.0008)	-.1145(-.0081)	.0319(.0038)	.6795
Security Specialist	.5573(.0320)	-.0214(-.0019)	-.0390(-.0019)	.0893(.0089)	.5849

[a]Raw score regression weights shown in parentheses.

Table 8

Assignments to Satisfied and Dissatisfied Groups Within Career

Career	Sample 1		Sample 2		
	Satisfied	Dissatisfied	Satisfied	Dissatisfied	Percentage Satisfied (Total)
Weather Observer	108	119	117	110	49.6
Radio Relay Repairman	111	92	115	88	55.7
Ground Equipment Repairman	71	103	72	102	41.1
Aircraft Maintenance	98	86	92	92	51.6
Vehicle Repairman	92	80	93	79	53.8
Accounting Specialist	126	105	132	98	56.0
Administration Specialist	87	105	94	97	47.3
Security Specialist	43	111	32	122	24.4
Total	736	801	747	788	48.3

As for the two Outdoor scales, the activities of Sample 1 are chiefly leisure activities; those of Sample 2 represent occupations. The Sample 1 scale included canoeing, hunting, sailing, fishing, camping, playing softball, picnicing, and riding trail bikes. The Sample 2 occupations and activities are performed outdoors: longshoremen, lineman, lumberjack, mason, surveyor, mowing lawns, pouring concrete, planting trees, and roofing.

Of course, these conclusions are speculative, but they do suggest considerations for further development of the a priori scales. The factor structure of the inventory and its relation to the a priori scales appear to be important. Since the a priori scales served as a model for constructing items, analysis of the factor structure of the total inventory would serve as a test of the a priori structure and would possibly provide alternative formulations for broad area scales like the a priori scales.

The items selected for the a priori scales, on the basis of Sample 1 combined with Sample 2, are given in Table A1 in Appendix A. In the Scientific scale, most of the competing items came from Sample 2; thus, the scale is oriented toward technical aspects of scientific endeavor. The Outdoor scale contains predominantly items indicating outdoor occupations, although there are a significant number related to outdoor leisure activity.

As indicated previously, the a priori scales were constructed with the aim of selecting items that were homogeneous. Internal consistency coefficients were calculated, using coefficient alpha, for each scale in each half-sample and the combined sample. These coefficients are presented in Table 9. The Sample 2 coefficients were larger than those obtained for Sample 1 for each scale; the coefficients for the combined sample were between those obtained for Samples 1 and 2. The coefficients obtained were less than those obtained by Katz et al (1970, p. 38), who achieved internal consistencies above 0.90 for 10 to 12 scales, but they were approximately the same as those presented in the examiner manual for the Kuder Preference Record-Vocational (Kuder, 1956, p. 21).

Selection of A Priori Scales for Cross-Validation

In using a priori scales to identify the occupational interests of recruits that will be similar to those of airmen satisfied with their careers, it is desirable to use fewer than the 13 scales. Moreover, it can be assumed that satisfaction in each career field depends upon varying combinations of interests. For example, one would expect interest in mechanics to be essential to satisfaction with the work of a General Purpose Vehicle Repairman (AFSC 473X0); one would not expect interest in mechanics to be a factor in satisfaction with work as an Administration Specialist (AFSC 702X0).

Table 9

Internal Consistencies for the A Priori Scales for
The Two Half Samples and the Combined Sample

	Internal Consistency[a]		
Scale	Sample 1	Sample 2	Combined
Audiographic	.8914	.8983	.8949
Food Service	.8907	.8974	.8941
Pedagogy	.8906	.9007	.8957
M-Scale	.8131	.8236	.8167
Leadership	.8458	.8515	.8486
Computational	.9255	.9317	.9274
Health Service	.8985	.9007	.8996
Scientific	.9089	.9293	.9279
Electronic	.9404	.9445	.9425
Outdoors	.8230	.8935	.8711
Mechanics	.9208	.9233	.9227
Clerical	.8955	.9006	.8988
Academic	.8811	.8932	.8921

[a]Measures of internal consistency obtained by calculating coefficient alpha,

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i}^{k} s_i^2}{s_t^2}\right) \qquad (6)$$

where k is the number of items in the scale; s_i^2 is the item variance; and s_t^2 is the total variance.

In order to determine which a priori scales to use for the cross-validation and what weights to apply to them, a stepwise regression analysis was performed for the scales developed for each half-sample. The dependent variable in these analyses was either satisfaction with a career field or membership in the men-in-general group. Analyses were performed independently for each field and each half-sample. Scales were included until the increase in the squared multiple correlation was less than 0.0025. The resulting scales for each career field in each half-sample, the combined sample, and their weights appear in Tables A2 through A13 in Appendix A. A negative weight in the tables indicates that individuals in the career field scored higher than individuals in the men-in-general group. Standardized regression weights, multiple correlations, and standard errors are also given in these tables.

The scales indicated by the analysis to reflect satisfaction with a given career field are logical. For example, Mechanics was the first scale, and thus the scale with the highest zero order correlation with the criterion, selected among men in the two careers in the Mechanics AQE requirement group (Aircraft Maintenance Specialist and General Purpose Vehicle Repairman). Similarly, the Electronic scale was the first scale selected among personnel serving as Radio Relay Equipment Repairman and Ground Equipment Repairman, the Computational scale among Accounting Specialists, and the Clerical scale among the Administration Specialists.

Selection of Items for the Occupational Scale

Occupational scales were developed for each of the eight careers. They were developed independently in each half-sample for cross-validation and in the combined sample for the recommended occupational scale. The stepwise regression technique used was equivalent to a discriminant analysis, which gives weights to independent variables (items in this case) so membership in one of two groups can be predicted with a minimum of error. The two groups considered were satisfied airmen in the career field for the scale being constructed and the recruits serving as men-in-general.

The number of items selected for each scale, multiple correlation, and number of satisfied airmen in each career field are presented in Table 10 for each half-sample. Few items were selected for both Samples 1 and 2--no scale had more than ten. A detailed list of the items selected, along with the standardized regression weight, the regression weights and their standard errors appear in Tables A10 through A18 in Appendix A. Negative regression weights indicate an item was preferred by the men-in-general group. Thus, for the Weather Observer scale based on combined samples, satisfied members of the career field responded more favorably than men-in-general to studying meteorology, planting and taking care of a vegetable garden, studying calculus, making weather forecasts, visiting a museum, helping write

Table 10

Number of Items, Multiple Correlation, and Number of Satisfied Airmen in the Career Field

SAMPLE 1

Occupational Scale	Items	Multiple r	Number Satisfied
Weather Observer	19	.7529	108
Radio Relay Repairman	29	.7914	111
Ground Equipment Repairman	28	.7291	71
Aircraft Maintenance	29	.7090	98
Vehicle Repairman	27	.7640	92
Accounting Specialist	17	.8289	126
Administration Specialist	15	.7108	87
Security Specialist	38	.7369	43

SAMPLE 2

Occupational Scale	Items	Multiple r	Number Satisfied
Weather Observer	22	.7649	117
Radio Relay Repairman	21	.7524	115
Ground Equipment Repairman	24	.7148	72
Aircraft Maintenance	24	.6385	92
Vehicle Repairman	23	.7723	93
Accounting Specialist	18	.8151	132
Administration Specialist	23	.6781	94
Security Specialist	27	.7520	32

questions for a test, writing a computer program, learning to navigate a boat, being a teacher, drawing blueprints for a bridge, and solving geometry problems. Compared to men-in-general, they tended to dislike marching in a parade, watching drag racing, organizing a military drill team, installing a telephone, fighting a fire, and constructing mathematical tables.

Two sets of weights were retained for the half-sample analyses and cross-validation. One set was the actual regression weight; the others were plus or minus one, depending on the sign of the regression weight.

Means and Standard Deviations

Means and standard deviations for all final scales were computed for each career field and men-in-general and are presented in Table A19 in Appendix A. All scale scores were first converted to a scale with a mean of 50 and a standard deviation of 10 for the entire sample of 3,072 airmen in the eight career fields. The men-in-general data were not used in obtaining the conversion parameters, but means and standard deviations for the men-in-general are reported on the converted scale.

For the most part, the men-in-general means and standard deviations closely approximate the overall values of 50 to 10. The largest departure from the mean of 50 occurred for the M-Scale. This is not surprising, since this particular scale entered early into the stepwise regression systems with more consistency than any other a priori scale. One might speculate that the difference is in large part the result of a shift in mean scores, which would occur as a recruit gains experience with military life. To put it another way, many of the activities or careers described in the M-Scale may lose some of their appeal once they are more directly encountered by an individual. Interestingly, satisfied personnel within all eight career fields had higher mean scores on both the M-Scale and the Leadership Scale than did their dissatisfied counterparts. Other a priori scales exhibited predictable patterns with high mean scores for satisfied personnel within the satisfied career fields logically related to a particular scale. Satisfied Accounting Specialists, for example, obtained a mean of 57.774 on the Computational Scale versus a mean of 45.920 for dissatisfied Accounting Specialists and 48.082 for men-in-general. Similarly, satisfied Radio Relay Repairmen obtained a mean score of 57.288 on the Electronics scale versus 52.511 for those dissatisfied within the same career field and 49.546 for men-in-general.

The occupational scale means exhibit a different but expected pattern. The highest means, of course, are obtained by the satisfied individuals in the career for which the scale was developed, the lowest for men-in-general, with the difference in means between these two groups averaging about one and one-half standard deviations. The dissatisfied personnel within the same career fields, however, achieved means almost as high as the satisfied personnel. A clear implication,

on the basis of the occupational scales, is that almost as many dissatisfied personnel would be placed in their present career fields as would satisfied airmen.

One factor which may, in part, account for this result is the explicit selection which took place when the career personnel involved in the present study were originally assigned to their respective fields. In order to be assigned to the Weather Observer field, for example, a man had to have an AQE General score at or above the 80th percentile. Thus, the Weather Observer group was subjected to explicit selection on General AQE and to incidental selection on all variables correlated with General AQE. An item might reveal differences between the men-in-general group and the satisfied career groups merely because the item was subject to the effects of incidental selection. If most items in a scale fell into this category, one would expect the results to be fairly close to the results shown in Table A19. It can be seen that the a priori scales which were not subjected to incidental selection during their construction exhibit a different pattern, with larger mean differences between satisfied and dissatisfied groups on the scales logically related to a given career group. Judging from the data presented in Table A19, use of the a priori scales on a purely logical basis would probably result in fewer dissatisfied personnel being reassigned to the same career.

The method which employs a men-in-general versus a career criterion group has been used as the primary technique in keying occupational inventories. Clark (1961) states "...a scoring key will be considered good if it does a good job of separating workers in a given occupation from workers in general." Campbell (1971) comments on the Strong Vocational Interest Blank: "The main purpose of men-in-general is to establish the general level of popularity of an item; this can then be compared with the rate of endorsement of the occupational sample to locate items that the members of the criterion sample answer differently from the reference sample."

In the recommendations section, several possible alternatives to the traditional use of a men-in-general group are suggested.

Correlations among the Scales

Correlations among the various scales are given in Table 11. Those for the occupational scales, in the upper portion of the triangular matrix, are generally low, with the possible exception of a clustering of the career fields with Electrical and Mechanical AQE requirements. The interest correlations for these four careers tend to be moderately high, although considerably lower than those presented by Campbell (1971, pp. 36-41) for occupations of a similar nature.

Correlations among the a priori scales are given in the right corner of the triangular matrix. Each correlation is positive, in

Table 11

Correlations Among Scales

	Weather Observer	Radio Relay Repairman	Ground Equipment Repairman	Aircraft Maintenance	Vehicle Repairman	Accounting Specialist	Administration Specialist	Security Specialist	Academic	Audiographic	Clerical	Computational	Electronic	Food Service	Health Service	Leadership	Mechanics	M-Scale	Outdoors	Pedagogy
Radio Relay Repairman	43																			
Ground Equipment Repairman	16	51																		
Aircraft Maintenance	21	41	64																	
Vehicle Repairman	-22	26	56	63																
Accounting Specialist	44	17	-08	-14	-25															
Administration Specialist	42	07	04	00	-20	47														
Security Specialist	09	-02	14	10	-02	11	38													
Academic	63	19	01	16	-26	17	36	01												
Audiographic	50	31	27	43	01	-05	21	02	50											
Clerical	29	-10	01	14	-12	18	55	16	40	46										
Computational	59	24	04	14	-15	39	50	06	49	51	67									
Electronic	21	51	48	57	38	-26	-08	-12	21	57	22	33								
Food Service	30	08	16	36	01	-06	33	22	51	47	48	34	30							
Health Service	43	07	05	24	-13	-03	26	15	57	54	45	43	30	59						
Leadership	36	-09	01	25	-05	-03	37	07	53	54	69	56	31	55	62					
Mechanics	08	30	50	73	58	-33	-18	-13	14	46	18	20	75	32	26	31				
M-Scale	04	-17	11	35	14	-37	-08	03	20	44	34	23	42	36	46	55	53			
Outdoors	17	22	44	67	39	-33	-08	06	24	51	18	15	55	41	40	35	65	63		
Pedagogy	60	08	00	21	-14	09	35	02	65	56	53	61	30	47	62	74	25	36	32	
Scientific	71	44	16	29	-10	11	23	00	65	65	34	61	48	43	65	50	33	33	38	64

contrast to that found by Clark (1961, p. 65) and Kuder (1956, p. 21) and similar to that obtained by Katz et al (1970, p. 33). The fact that some inventories report predominantly positive intercorrelations, while others report intercorrelations that are mixed in sign, most likely represents the differences in item format used. If a forced-choice format is used, as in Clark and Kuder, correlations of a mixed nature are likely to result. On the other hand, if there is no constraint on responding to an item, a general willingness to respond either favorably or unfavorably will be indicated by the positive correlations.

In order to get some notion of the structure of the relationship among the a priori scales, scales having intercorrelations greater than 0.60 were identified. Similarly, scales correlating between 0.55 and 0.60 were noted. The interrelationships of the scales were represented as a network, with the scales serving as points and the correlations above 0.60 as arcs forming the network (Figure 1). One can see three clusters forming. One represents Electronic-Mechanics-Outdoors-M-Scale activities, a second represents the remaining scales except for Food Service, which stands alone even though it relates somewhat to the scales in the second cluster.

The purpose of presenting data in this form is to provide some suggestions for modifying the a priori scales in subsequent studies. It should be emphasized that the subject of this report is the initial phase in the development of an effective vocational interest inventory. The primary purpose of this phase was to develop an item pool, field test the pool, and construct experimental scales. Subsequent efforts should be aimed at modifying the experimental scales, adding new scales, and deleting redundant or misleading scales. Examination of Figure 1 may suggest modifications of the a priori scales. For example, the Scientific and Pedagogy scales each have correlations of 0.60 or more with five other scales. Further, four of the five high correlations are common for both scales. This suggests that it might be profitable to attempt to combine these scales.

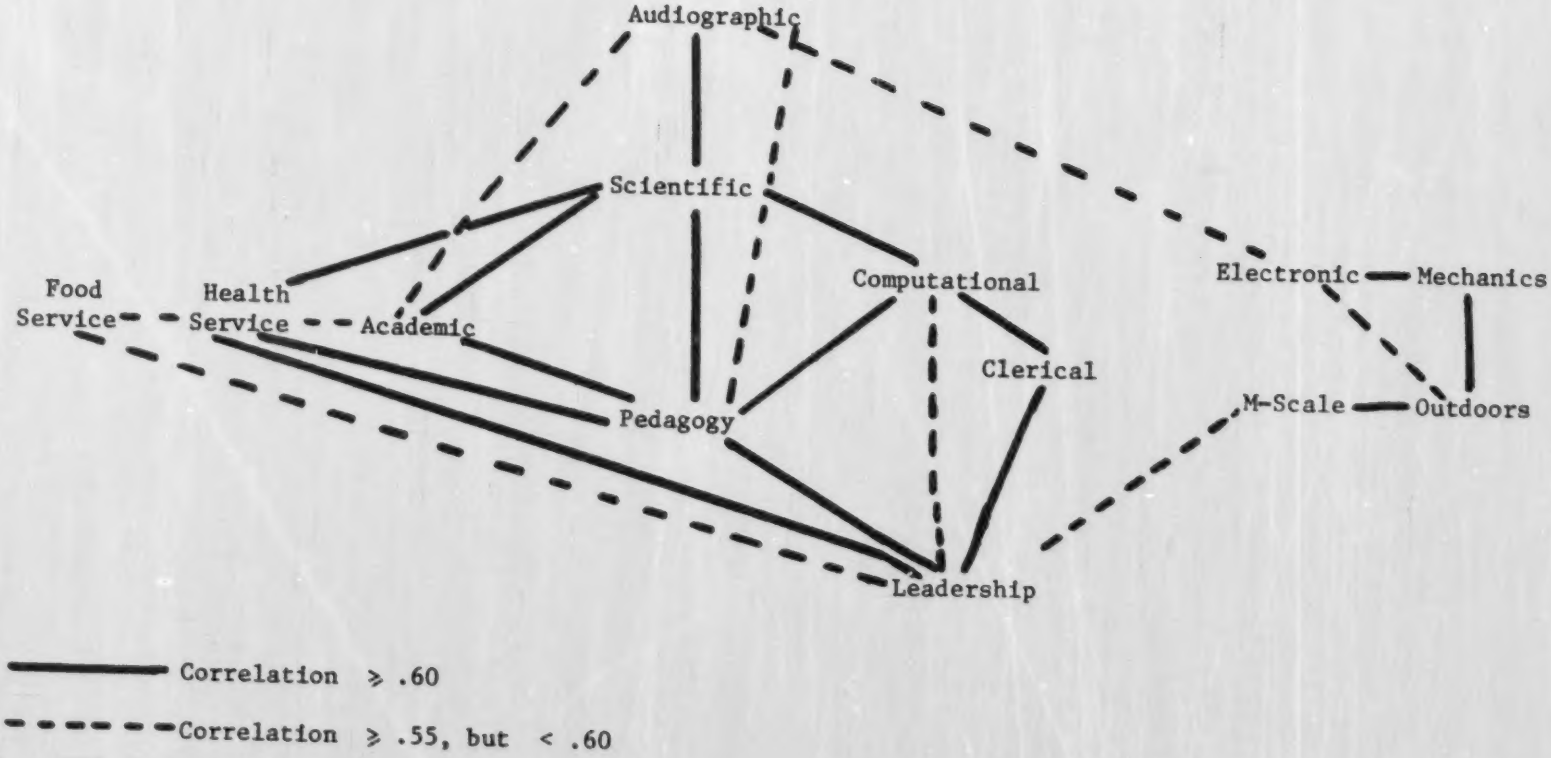
Correlations between the a priori scales and the occupational scales appear in the lower left corner of the matrix in Table 11. These correlations seem logical, in that scales for career fields that are mechanical in nature correlate highly with mechanical interest. The same holds generally for Electronic and Clerical career fields.

Test-Retest Reliability Estimation for the Scales

In order to estimate the reliability of the scales obtained from the combined sample, scores on the scales obtained from the two administrations of VOICE to the subsample of 209 men-in-general were correlated. It should be recalled that these men were in basic training at the time of both administrations.

Figure 1

Network Illustrating the Interrelationship
Between the A Priori Scales



The correlations were low in comparison to those for other interest scales. Correlations ranged from 0.35 to 0.55 for the occupational scales, with virtually all scales having correlations within 0.05 of 0.50. Correlations for the a priori scales were higher and ranged from 0.54 to 0.74. Due to the fact that these correlations were considerably lower than those obtained by both Strong on the Vocational Interest Blank and Clark on the Minnesota Vocational Interest Inventory (they consistently obtained test-retest correlations of 0.80 or higher for their scales) and lower than one might expect by examining the internal consistency estimates, the validity of these correlations as reliability estimates must be questioned.

In obtaining estimates of reliability for an instrument administered on two separate occasions, the instrument must be administered independently and under identical conditions. In theoretical terms, this means that the distributions must be identical for each trial; that is, the expected value or mean of the measurement must be the same for both administrations. Further, the variances must be the same for both administrations. For detailed discussion of conditions necessary for a test-retest correlation to serve as an estimate of reliability, the reader is referred to Lord and Novick (1968, Sections 3.3 and 3.4).

To determine whether the correlations obtained were valid estimates of reliability, the conditions were examined to see how appropriate they were. The differences between the raw score means and raw score variances for each trial were obtained and are presented for each scale in Table 12. In addition, an F-test was performed to test the equality of the raw score variances, and a t-test was performed to assess the significance of the difference in means where the variances were concluded to be identical. The significance level used was the 0.05 level, with a "yes" entry in Table 12 indicating significance.

Certain features of the data stand out. For example, all the differences in the means have the same sign for each type scale. Although this result is difficult to interpret for the occupational scale, since both positive and negative items weights comprise a scale, an interpretation can be made for a priori scales. Apparently, there was a greater tendency to dislike items on the second administration, which was reflected in the consistently positive mean differences. Also, with one exception, the raw score item variances for the first administration were larger than those obtained on the second administration.

In examining the significance tests, six of 21 tests for equality of variance were significant. Eight of 15 tests for zero mean differences were significant. Only seven scales failed to achieve significant differences in either raw score mean or variance. These results, taken simultaneously, indicate that the conditions, which were necessary to validate the correlations obtained as accurate reliability estimates, were generally not satisfied. Thus, the obtained correlations cannot be used as reliability estimates.

Table 12

Differences in Raw Score Means, Raw Score Variances,
And Their Significance for Two Repeated Trials

Scale	Difference In Means $\bar{x}_1 - \bar{x}_2$	Variance On Trial 1 $V(x_1)$	Variance On Trial 2 $V(x_2)$	Significant Difference Variances	Significant Difference Means
Weather Observer	-1.62	17.54	16.21	No	Yes
Radio Relay Repairman	-1.23	18.92	16.70	No	Yes
Ground Equipment Repairman	-0.50	11.31	9.40	No	Yes
Aircraft Maintenance	-0.96	18.25	16.86	No	Yes
Vehicle Repairman	-0.44	13.62	14.78	No	No
Accounting Specialist	-0.89	12.74	11.74	No	Yes
Administration Specialist	-1.48	20.72	16.48	Yes	*
Security Specialist	-0.91	14.53	10.47	Yes	*
Audiographic	1.59	69.30	59.32	No	Yes
Food Service	1.53	57.56	37.93	Yes	*
Pedagogy	0.57	41.25	39.51	No	No
M-Scale	0.50	50.26	43.82	No	No
Leadership	0.43	41.12	31.39	Yes	*
Computational	1.70	86.12	70.80	Yes	*
Health Service	1.10	68.32	61.92	No	No
Scientific	1.42	94.83	82.99	No	Yes
Electronic	0.99	98.63	97.35	No	No
Mechanics	0.73	75.67	71.95	No	No
Clerical	1.12	70.50	52.01	Yes	*
Outdoors	0.55	46.82	46.15	No	No
Academic	2.34	71.41	62.06	No	Yes

*Statistical tests of the significance of the mean differences were not performed in cases where significant heterogeneity of variance was concluded.

Further evidence of the lack of parallelism between the two VOICE administrations appear in Table 13, which gives the correlations among the a priori scales for the two administrations. The upper-right triangular matrix represents correlations obtained for the first administration, the lower-left triangular matrix represents correlations obtained for the second administration. If one expected the conditions of the two administrations to produce equal scores and variances for both administrations, one would expect the correlations among the scales to be equal, at least to the extent achieved in the previous samples. This did not happen. The correlations for the second administration were consistently higher than those of the first, indicating more consistent responses to all items in the second administration. Since the correlations differed considerably, one must conclude that reliability was not being measured.

The correlations obtained may be of some use though. If the means vary with time, as the data suggest, the correlations are known to underestimate the true reliability (Cochran, 1970).

The actual correlations obtained for each scale have not been presented since such a presentation might result in an inaccurate condemnation of the scale reliabilities. Estimation of scale reliabilities should be performed in the future under rigid conditions so that the estimates may be reported.

Cross-Validation

The percentages of correct classifications (hits) within each career field, using each of four different methods, are presented separately for each half-sample in Table 14. Two base rates are shown (at the far right) for comparative purposes. Base 1 is a "maximum blind strategy" in that it will yield the highest possible percentage of expected hits with the absence of any information that might relate individuals to groups. Under such conditions, classifying all individuals in the larger of the two groups will achieve the most hits. Base 2 represents proportional random assignment--a less than optimal strategy but one that might be employed in a situation where no useful information about individuals is available, but quotas must be met. Under this system, individuals are assigned at random to one of two groups until a quota is filled for one of the groups. The same classification proportions or probabilities were used to compute the base rates as were used in the classification functions.

Except for Security Specialist all of the methods bettered the base rates with some consistency in both samples. Since so few individuals were classified as satisfied within Security Specialist, it is not surprising that the cross-validations yielded unimpressive results in this field. As Table 14 shows, the occupational scales appeared to be superior to the a priori scales for classifying individuals accurately. Nevertheless, Table 14 indicates that both types of scales possess considerable value for classification purposes.

Table 13

Correlations Among A Priori Scales for Two Administrations[a] of VOICE

	Audio-graphic	Food Service	Pedagogy	M-Scale	Leadership	Computational	Health Service	Scientific	Electronic	Mechanics	Clerical	Outdoors	Academic
Audiographic		.3941	.4983	.3295	.4687	.5764	.4272	.7048	.6711	.4903	.3009	.4515	.5755
Food Service	.4967		.4553	.3734	.5749	.3946	.4901	.4330	.2805	.2952	.3713	.3796	.4511
Pedagogy	.6843	.6036		.4138	.7552	.6496	.5917	.6196	.3672	.2339	.5129	.3109	.6444
M-Scale	.5670	.5046	.6217		.5697	.2133	.4253	.3291	.3107	.4998	.1551	.6919	.3842
Leadership	.6075	.6837	.8420	.6832		.5859	.6141	.5052	.3387	.2950	.6409	.3494	.5509
Computational	.6679	.5527	.7453	.4538	.6776		.4403	.6280	.4190	.2077	.5609	.1743	.5265
Health Service	.6026	.6362	.7444	.5949	.7407	.6178		.6151	.3407	.2486	.3723	.4280	.5122
Scientific	.7182	.5224	.6813	.5435	.5813	.6956	.7018		.5646	.3419	.2337	.4741	.7122
Electronic	.7107	.4319	.4733	.4680	.4643	.5196	.4257	.5887		.7218	.1054	.5351	.3749
Mechanics	.5734	.4667	.4219	.6017	.4592	.4077	.4085	.5102	.7345		.0324	.6166	.2609
Clerical	.4885	.5827	.6716	.4612	.7845	.6835	.6048	.4162	.3024	.2911		.0234	.3281
Outdoors	.5740	.4700	.4861	.7252	.4500	.3586	.4490	.5211	.5755	.6908	.2988		.3947
Academic	.6212	.6204	.7118	.5579	.6850	.6403	.6711	.7493	.4662	.4515	.5394	.4549	

[a]First administration correlations are above the diagonal; second administration, below.

Table 14

Percent Correct Classifications Achieved Using Four Different Methods

SAMPLE 1

Career	Exact Occupational	Unit Occupational	Exact A Priori	Integer A Priori	Base 1	Base 2
Weather Observer	77.6	77.6	71.9	82.1	58.9	51.6
Radio Relay Repairman	78.6	80.5	75.2	77.8	58.3	51.4
Ground Equipment Repairman	74.3	78.8	68.6	69.0	68.6	56.9
Aircraft Maintenance	71.1	70.4	64.0	75.7	61.3	52.2
Vehicle Repairman	79.8	80.2	83.1	82.2	62.8	53.3
Accounting Specialist	86.8	77.9	78.6	78.6	55.2	50.1
Administration Specialist	69.8	78.1	64.5	68.0	64.0	53.9
Security Specialist	78.8	69.7	78.3	56.6	78.3	66.0
Total Percent Correct	77.8	77.9	72.7	74.4	62.8	53.9

SAMPLE 2

Career	Exact Occupational	Unit Occupational	Exact A Priori	Integer A Priori	Base 1	Base 2
Weather Observer	80.1	79.4	73.9	74.3	57.0	51.0
Radio Relay Repairman	81.1	81.9	75.6	75.6	57.8	51.2
Ground Equipment Repairman	74.0	71.8	68.3	65.6	68.3	56.7
Aircraft Maintenance	71.3	70.9	62.3	66.8	62.8	53.3
Vehicle Repairman	79.8	79.4	69.8	71.4	62.5	53.1
Accounting Specialist	85.0	81.2	69.3	72.8	54.0	50.3
Administration Specialist	68.3	62.2	65.5	63.9	62.2	53.0
Security Specialist	82.9	72.9	82.9	63.6	82.9	71.6
Total Percent Correct	77.9	75.3	70.7	69.7	62.4	54.3

Though there was virtually no difference between the unit weights and exact regression weights for the occupational scales in Sample 1, there appeared to be a slight difference in favor of the regression weights in Sample 2 when the total percentages of correct hits were considered. There appeared to be little difference between the regression weights and the integer weights when the a priori scales were used to classify individuals.

Table 15 shows the percent of correct classifications within career groups and men-in-general groups. Since the decision rules used for classification were aimed at minimizing the total number of errors, there tended to be some overassignment to the larger men-in-general group. It is important to recognize that the within-group hits do not imply that the interest scales developed are better for the men-in-general group. Had the satisfied career groups been larger than men-in-general, the overassignment would have been to the career groups.

Discriminant Analyses

The first discriminant analysis with 16 groups and the a priori scale scores as independent variables extracted 13 latent roots and 13 corresponding discriminant functions. In Appendix A, Table A20 presents the 13 vectors, or orthogonal linear functions, of the a priori scales. Table A21 in Appendix A presents the "centroids" of each group on each discriminant function.

Figure 2 presents the configuration of the 16 groups in the two dimensions, defined by the first two discriminant functions. The first discriminant function is characterized by a relatively large positive weight for the Computational scale and relatively large negative weights for the Electronic and Mechanics scales. The two Accounting Specialist groups had the highest negative positions on this discriminant function; the highest positive values were accorded the two Vehicle Repairman groups. The factor underlying the first dimension might be interpreted as a bipolar factor, with one end characterized by high interest in Computational tasks and low interest in Mechanics and Electronics and the other end characterized by high interest in Mechanics and Electronics and low interest in Computational tasks.

The second discriminant function can also be interpreted as a bipolar factor. One end is characterized by high scores on Electronics and Science and low scores on Clerical, and the other end is characterized by the reverse pattern. The most extreme groups are the satisfied Radio Relay Repairman group and the satisfied Administration Specialists.

In terms of the distances between groups on the first two discriminant functions, the satisfied and dissatisfied groups within a career field are relatively close. This suggests that the interest patterns of the two groups within a field are more similar than for

Table 15

Percent Correct Classifications Achieved within Career and Men-In-General (MIG) Groups Using Four Different Methods

SAMPLE 1

Career	Exact Occupational		Unit Occupational		Exact A Priori		Integer A Priori	
	Career	MIG	Career	MIG	Career	MIG	Career	MIG
Weather Observer	59.3	90.3	76.9	80.0	35.2	97.4	83.3	81.3
Radio Relay Repairman	68.5	91.0	76.6	83.2	57.7	87.7	85.6	72.3
Ground Equipment Repairman	22.5	98.1	67.6	83.9	0.0	100.0	70.4	68.4
Aircraft Maintenance	31.6	96.1	65.3	73.5	8.2	99.4	81.6	70.3
Vehicle Repairman	59.8	91.6	81.5	79.4	48.9	98.7	85.9	80.0
Accounting Specialist	81.7	91.0	84.9	86.5	71.4	84.5	73.8	82.6
Administration Specialist	21.8	96.8	65.5	85.2	1.1	100.0	66.7	69.7
Security Specialist	4.7	99.4	41.9	77.4	0.0	100.0	41.9	60.6

SAMPLE 2

Career	Exact Occupational		Unit Occupational		Exact A Priori		Integer A Priori	
	Career	MIG	Career	MIG	Career	MIG	Career	MIG
Weather Observer	66.0	91.0	74.4	83.2	50.4	91.6	67.5	79.4
Radio Relay Repairman	67.0	91.6	76.5	85.8	59.1	87.7	83.5	69.7
Ground Equipment Repairman	26.4	96.1	65.3	74.8	0.0	100.0	81.9	58.1
Aircraft Maintenance	42.4	88.4	65.2	74.2	0.0	99.4	64.1	68.4
Vehicle Repairman	62.4	90.3	71.0	84.5	34.4	77.5	82.8	64.5
Accounting Specialist	87.9	82.6	89.4	74.2	47.7	87.7	72.0	73.5
Administration Specialist	36.2	87.7	56.4	65.8	11.7	98.1	66.0	62.6
Security Specialist	0.0	100.0	34.4	80.6	0.0	100.0	56.3	65.2

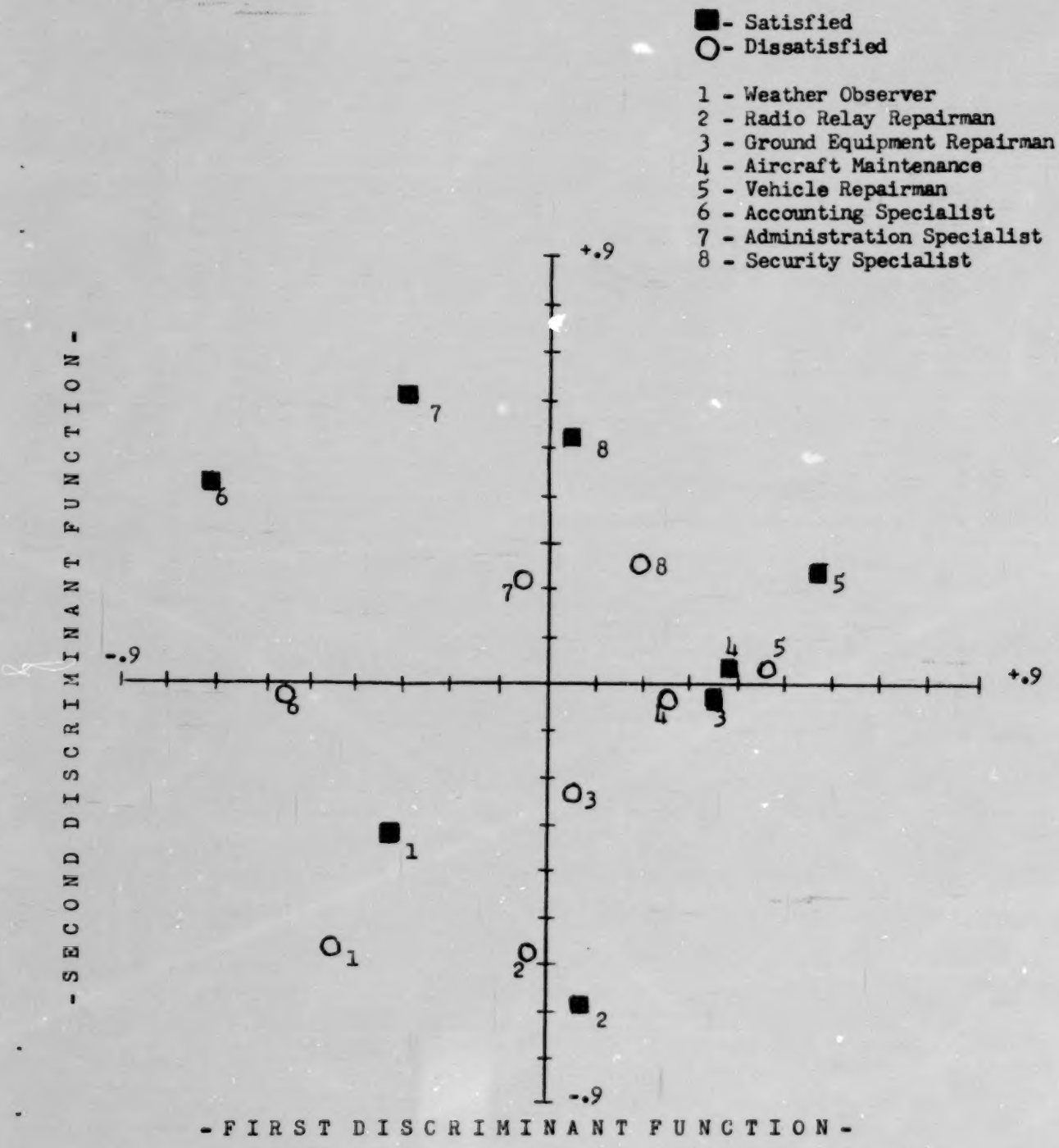


Fig. 2 Placement of Group Centroids in Discriminant Space Defined by the First Two Discriminant Functions of the A Priori Scales

groups in different fields, which is to be expected. Some exceptions do occur, however. For example, the satisfied Ground Equipment Repairman and dissatisfied Vehicle Repairman fall into a fairly tight cluster with the two Aircraft Maintenance groups.

The second discriminant analysis was performed with the 16 groups again serving as dependent variables and the eight occupational scales serving as the independent variables. Tables A22 and A23 in Appendix A present the eight latent vectors derived and the centroids of each group on each discriminant function. The first two latent vectors from this analysis can also be interpreted as bipolar factors with each having one high positive and one high negative weight corresponding to a scale. As Figure 3 shows, the configuration of the 16 groups on the first two discriminant functions is quite similar to that in Figure 2.

Conclusion

Our statistical analyses indicate that the experimental inventory possesses considerable utility for distinguishing among career groups and for distinguishing between satisfied and dissatisfied personnel within career fields and a men-in-general group. Based on the results, it is estimated that an inventory of 246 items would be required to construct all scales in final form. The sample sizes used to develop the occupational scales were minimal at best and in some cases, inadequate. Campbell (1971) suggested using two independent samples of 200, stressing homogeneity and making sure that men who perform the occupation in some unusual form are not included. The sample sizes used to develop the final occupational scales for the eight career fields of VOICE ranged from 75 for Security Specialist to 258 for Accounting Specialist. The cross-validation results which were based on only half the number used for the final scales reflect the differences in sample sizes in the different careers. In fields where large samples were available, the occupational scales generally crossed better than in fields where smaller sample sizes were available. The cross-validity estimates are, of course, lower bound estimates of validity since they are based on only half the sample.

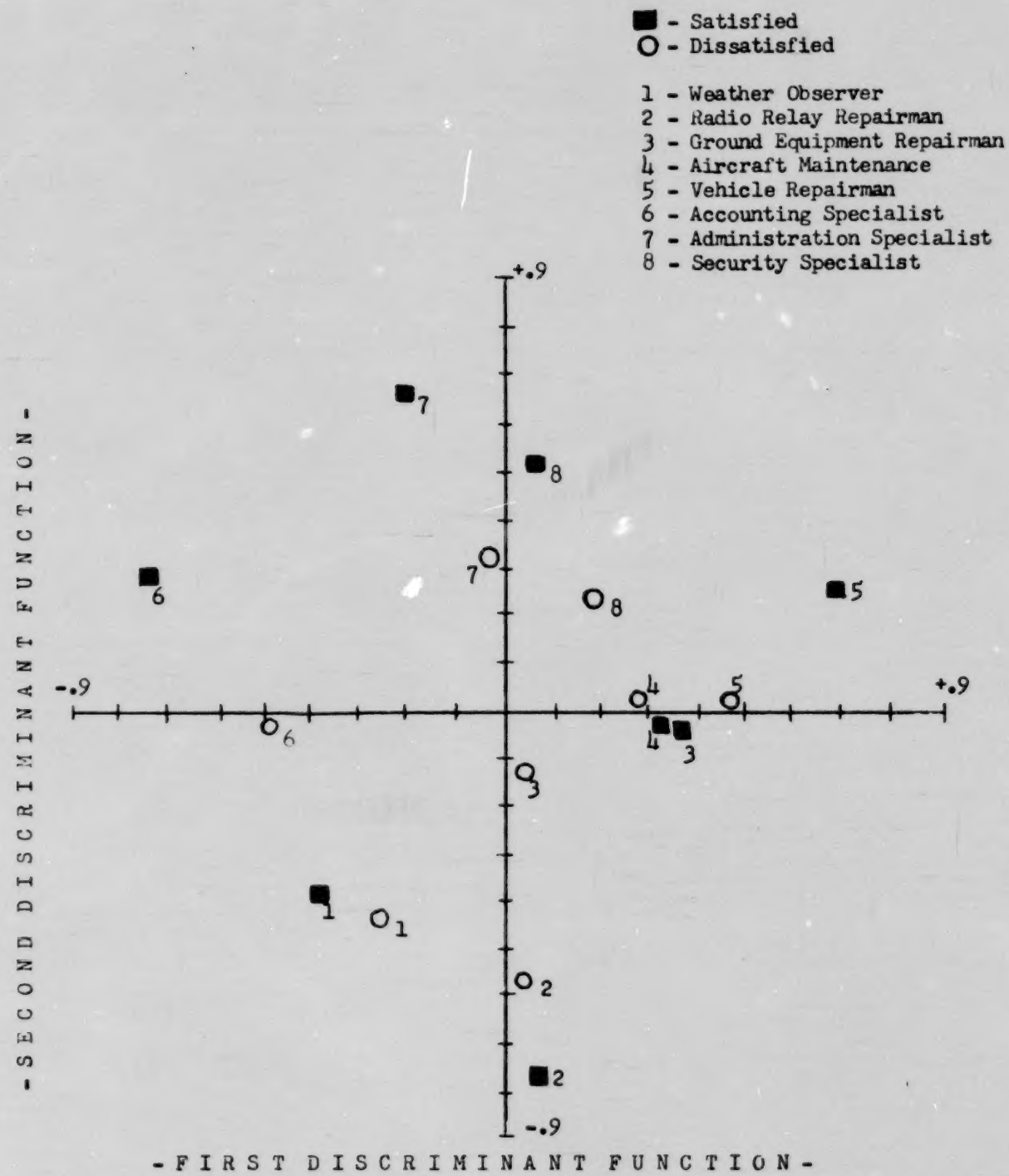


Fig. 3 Placement of Group Centroids in Discriminant Space Defined by the First Two Discriminant Functions of the Occupational Scales

SECTION VI

Recommendations

For most of the Air Force career fields included in the field test of VOICE, the validity of the occupational and a priori scales as measures of recruits' vocational interests has been demonstrated. The evidence presented in this report indicates that by means of these scales it is possible to classify men with considerable accuracy in either an occupational or basic recruit group.

However, a number of problems have come to light which require solution prior to the operational use of VOICE. Among these problems are the similarity of the interest patterns observed in dissatisfied and satisfied groups within a career, the rather small criterion groups which were available, and the apparent shift in the interest patterns of basic recruits over a period of three weeks. Although a final set of items is recommended for the inventory, it is suggested that the following additional research be undertaken.

1. Conduct a Longitudinal Study of Interest

   In this developmental effort, the scales of the inventory were validated using a standard cross-validation technique. Although this method of validating measures is worthwhile, it fails to examine the facet of validity that deals with prediction. In other words, do the interest scales, or scores, obtained early in an airman's service predict his subsequent satisfaction with his Air Force career field? This is an essential aspect of validity that must be confirmed prior to the adoption of any measure of vocational interest.

   Associated with this problem is the question of whether interests change as a result of experience in a career. It should be recalled that the mean scores, produced in this field test for the occupational scales, showed that airmen dissatisfied with their careers were closer in their interests to satisfied airmen in the same career than they were to men-in-general. One reason for this may be that airmen who are dissatisfied with a career field do, nevertheless, acquire some interests in common with those of men who like the field. Knowledge of the job, alone, may cause this. The validity of this hypothesis needs to be examined.

   Also, a longitudinal study would allow the examination of the stability of many items comprising the M-scale. For example, two items, "March in a parade" and "Take part in a military drill," appear in a number of scales. These items appeared to identify satisfied personnel, in that men

satisfied with their careers tended to dislike these activities more than men-in-general. However, this may have been due to the fact that the men-in-general had not been extensively exposed to such activities. After some experience in military service, recruits' interest in these activities may decline regardless of their satisfaction with their careers. By identifying items such as these, which may correlate with time and thus be useless for prediction, the validity of the scales would be increased.

Such a longitudinal study could be conducted by following up the men-in-general group used in this field test. Repeated annual administration of VOICE to these men would provide an initial group, to be followed by subsequent groups of new recruits until a sample size is reached that would allow significant longitudinal inference.

2. Expand the Men-In-General Group

Closely associated with the longitudinal study could be the establishment of accurate statistical data for men-in-general. The importance of obtaining sound estimates for the distributions of responses cannot be overstated. The men-in-general group is used in either the development or validation of all scales for VOICE.

Strong (1954, Chapter 21) illustrates the effects of different men-in-general groups on correlations, scoring weights, and occupational clusters. His first men-in-general sample consisted of a few thousand men he happened to test during development of the Vocational Interest Blank. He modified this sample by using various U. S. Bureau of the Census statistics on employed men. Since then, several revisions of the men-in-general group have taken place. The group developed in 1969 includes some 1,000 men, stratified by general occupational area and specific occupation (Campbell, 1971, pp. 398-399, for a detailed listing of occupations).

The statistical standards of the men-in-general group used to test VOICE do not compare to Strong. We urge that the group be revised until it possesses sufficient quality. Under simple random sampling, a sample size of 625 airmen ensures that the standard deviation of a proportion will be less than 0.02.

The precision could undoubtedly be increased by using stratified sampling. Men-in-general could be stratified by numerous variables (AQE score range, career field, and biographical information are possibilities) in conjunction with other studies of their interest. There is no doubt that scales developed with such a sample would be more accurate.

3. Test the Factor Structure of the A Priori Scales

As stated in the section describing the development of the a priori scales, an underlying structure was hypothesized for the inventory and items were written accordingly. Whether that structure was, in actuality, realized is open to question. A factor analysis of the items in VOICE would serve to answer the question. The analysis could be conducted immediately without collecting additional data.

The results of a factor study might indicate that the a priori scales should be modified. For example, the factor analysis might suggest that the Pedagogy and Scientific scales be combined or that the Outdoor scale be divided into two separate scales.

4. Revise the Job Satisfaction Scale

The evidence gathered indicates that the nature of the work itself is of overwhelming importance in determining how satisfied an airman is with his career. Rather than include scales which attempt to measure other factors, it is suggested that the job content scale be made more reliable by adding items and performing an item selection such as that performed for the a priori scales in the present study.

5. Investigate the Use of Continuous Criterion for Prediction

An alternative to a two group criterion should be investigated. A multiple regression approach with a continuous criterion would seem to have the most promise. It would develop inventory scales against a continuous criterion of satisfaction. An individual could then be classified on the basis of a combination of manpower requirements in various fields and the satisfaction scores predicted for him in each of several fields.

6. Examine Methodological Problems

A number of methodological questions surround the traditional procedures used to key interest inventories. The effects of explicit selection on AQE scores are not clear; i.e., men are eligible for certain careers only within a given AQE score range. For example, it would not be necessary to use the Weather Observer's scale for anyone with an AQE General score of less than the minimum required score of 80. Thus, discrimination should be only between satisfied Weather Observers and those men-in-general whose AQE score qualifies them. Such explicit selection could have considerable impact, particularly when the occupational scale approach is used.

Along the same line there are undoubtedly other selection factors producing self-selection. To what extent these factors affect the interest scales and decision rules arrived at is not clear. It may be possible to perform range-restriction correlations of some kind on the within-career personnel, using a men-in-general sample to achieve more useful results. A theoretical and an empirical approach to these questions is needed.

7. Estimate Test-Retest Reliability

The establishment of reasonable standards of measurement error for a psychological test is paramount in a developmental effort. When an instrument contains a significant degree of measurement error, its usefulness as an indicator of present status or a predictor of future behavior is questionable. In psychological measurement, measurement error is defined in terms of reliability coefficients and is frequently estimated by obtaining correlations between two administrations of a test.

If a correlation between scores on two administrations is to serve as an estimate of reliability, the administrations must be conducted independently and under identical conditions. Furthermore, the distributions of the test scores for the two administrations must be identical.

It is recommended that such a reliability study be conducted under strict control. The subjects for this study should not be in basic training, but rather in the field. This would make the assumption of equal variance more likely to occur in practice. The test should be administered under supervised conditions on both occasions and under conditions in which the men are at ease so that measurement of their interests can take place with minimum error.

8. Establish Methodology for Differential Assignment

No attempt was made to differentiate career interests among two or more of the various career fields at one time. The inventory may classify a man to an occupational area as opposed to men-in-general. However, in the actual recruiting situation, the man who could conceivably have interests identified in more than one career area must be assigned to only one area. In a situation such as this, the comparability of interest scores must be taken into consideration. To do this, an investigation should focus on interest scales which differentiate between a number of career fields being considered simultaneously.

9. Develop Additional Scales

The occupations represented in the present study were necessarily limited. It is strongly recommended that a greater variety

of occupational scales than the eight in the present study be developed. It is suggested, however, that this step not be carried out until some of the questions and issues addressed in the preceding recommendations have been answered.

References

Beaton, A. E. The use of special matrix operations in statistical calculus. ETS Research Bulletin RB 64-51. Princeton, N. J.: Educational Testing Service, 1964.

Buros, O. K. (ed.) The sixth mental measurements yearbook. Highland Park, N. J.: Gryphon Press, 1965.

Campbell, D. P. Handbook for the Strong Vocational Interest Blank. Stanford, Ca.: Stanford University Press, 1971.

Clark, K. E. The vocational interests of nonprofessional men. Minneapolis: University of Minnesota Press, 1961.

Cochran, W. G. Some effects of errors of measurement on multiple correlation. Journal of the American Statistical Association, 1970, 65, 22-34.

Cooley, W. M., & Lohnes, P. R. Multivariate procedures for the behavioral sciences. New York: John Wiley & Sons, 1962.

Department of the Air Force. Enlisted Personnel Airman Classification Manual. AF Manual 39-1. Washington, D. C.: USAF, 1970.

Dictionary of Occupational Titles: Volume I Definitions of Titles and Volume II Occupational Classification. Washington, D. C.: U. S. Government Printing Office, 1969.

Draper, N. R., & Smith, H. Applied regression analysis. New York: John Wiley & Sons, 1966.

Katz, M. R., Norris, L., & Halpern, G. The measurement of Academic Interests: Part I, Characteristics of the academic interest measures. Research Bulletin RB 70-57. Princeton, N. J.: Educational Testing Service, 1970.

Kuder, G. F. Kuder Preference Record, Vocational Form C. Chicago: Science Research Associates, 1956.

Locke, E. A., Smith, P. C., & Hulin, C. L. Cornell studies of job satisfaction: V. scale characteristics of the Job Descriptive Index. Mimeo. Ithaca, N. Y.: Cornell University, 1965.

Lord, F. M., & Novick, M. R. Statistical theories of mental test scores. Reading, Ma.: Addison-Wesley, 1968.

Perry, D. K. Forced-choice vs. L-I-D response items in vocational interest measurement. Unpublished doctoral dissertation, University of Minnesota, 1953.

Robinson, J. P., Athanasiou, R., & Head, K. B. Measures of occupational attitudes and occupational characteristics. Ann Arbor, Mi: Survey Research Center, Institute for Social Research, The University of Michigan, 1969.

Strong, E. K., Jr. Vocational interests of men and women. Stanford, Ca.: Stanford University Press, 1954.

Zuckerman, J. V. A note on "interest item response arrangement." Journal of Applied Psychology, 1953, 37, 94-95

Appendix A

Table A1

Items in A Priori Scales Based on Combined Data

Scale	Items
Audiographic	22. Draftsman
	55. Photoengraver
	56. Photographer
	63. Printer
	83. Television cameraman
	104. Draw blueprints for a bridge
	115. Take aerial photographs
	134. Draw graphs
	141. Draw maps from photographs
	157. Operate a 16mm movie camera
	175. Make drawings with a compass, triangle, ruler, and other instruments
	203. Operate a printing press
	218. Record speeches with a cassette recorder
	225. Record the sound track for a motion picture
	228. Develop photographs
	358. Join a photography club
Food Service	6. Baker
	13. Chef
	21. Dietitian
	48. Meat cutter
	86. Waiter
	121. Mix pancake batter
	127. Plan menus
	167. Decorate cakes
	234. Manage a cafeteria
	253. Work as a short-order cook
	264. Run a food catering service
	324. Improve a recipe
	328. Buy food for a cookout
	376. Chinese cooking
	381. Food processing
	392. Nutrition
Pedagogy	80. Teacher
	129. Explain a complicated chart to a group of people
	170. Give on-the-job training
	171. Correct test papers
	182. Help write questions for a test
	183. Teach someone to read
	186. Demonstrate the proper way to use a power tool
	211. Teach someone how to solve a problem
	220. Administer an intelligence test
	229. Give a talk before a small group
	235. Help a high school student with his homework
M-Scale	10. Boxer
	17. Construction worker
	19. Customs agent
	27. Explosives detonator
	32. Football coach
	36. Highway patrolman
	46. Manager (warehouse)
	58. Pilot
	60. Policeman
	160. Stop a prison riot
	190. Take part in a military drill
	214. Organize a military drill team
	345. Go trap shooting
	354. Become a karate expert
	363. Collect rifles and pistols
	368. Belong to a gun club
Leadership	32. Football coach
	46. Manager (warehouse)
	54. Personnel manager
	149. Supervise workers on an assembly line
	196. Supervise an inventory of textile goods
	209. Supervise work in a garage
	214. Organize a military drill team
	215. Organize and lead a study group
	234. Manage a cafeteria
	236. Be in charge of employing people for a business
	265. Supervise activities for mentally ill patients
	300. Organize recreational activities for a group of people
Computational	1. Accountant
	16. Computer programmer
	74. Statistician
	91. Find information in numerical tables
	139. Compile statistical tables
	151. Write a computer program
	156. Solve arithmetic problems
	166. Work with numbers
	169. Use a table of logarithms to solve a mathematics problem
	174. Find the errors in a computer program
	187. Prepare income tax returns for other people
	242. Correct errors made by another person in an arithmetic problem
	248. Use an adding machine to check hand calculations
	250. Operate a machine that sorts punched cards
	301. Devise shortcut methods for adding numbers
	374. Calculus

Table A1

Items in A Priori Scales Based on Combined Data (Continued)

Scale	Items
Health Service	20. Dental hygienist
	21. Dietitian
	57. Physical therapist
	62. Practical nurse
	66. Psychologist
	85. Veterinarian
	99. Take blood pressure readings
	113. Give first aid to accident victims
	142. Assist a surgeon during an operation
	144. Help rescue someone from a fire
	265. Supervise activities for mentally ill patients
	268. Help give physical examinations
	274. Assist a dentist by cleaning teeth
	278. Fill prescriptions for a doctor
	378. Disease prevention
	385. Human physiology
Scientific	66. Psychologist
	70. Scientist
	88. Weather forecaster
	192. Determine concentrations of ethyl alcohol in a liquid
	199. Help a scientist perform an experiment
	217. Devise special scientific equipment for an experiment
	219. Determine the age of a fossil
	227. Use a microscope to classify bacteria
	243. Classify rocks by their physical properties
	257. Solve problems by analyzing them logically
	258. Determine the cost of operation of a new machine
	313. Read articles about science
	341. Demonstrate your work at a science fair
	361. Collect and classify insects
	388. Microscopes
	394. Physics
Electronic	25. Electrician
	68. Radio mechanic
	82. Technician (electronics)
	83. Television cameraman
	267. Use a voltmeter
	276. Find and replace defective transistors
	277. Plan an electrical system for a house
	279. Use a soldering iron
	282. Test television tubes
	317. Build a stereo system
	323. Build an antenna for a ham radio set
	336. Tinker with old radios
	338. Read about electronics
	350. Take a telephone apart to see how it works
	357. Build a radio
	400. Wiring diagrams
Outdoors	11. Carpenter
	17. Construction worker
	27. Explosives detonator
	41. Longshoreman
	43. Lineman (electric company)
	44. Lumberjack
	77. Surveyor
	177. Pour concrete for highway construction
	189. Plan trees in a forest
	226. Install lightning rods on buildings
	230. Help put a new roof on an old house
	319. Go canoeing
	333. Ride a trail bike through the woods
	355. Go sailing
	356. Learn survival techniques for living in the wilderness
	369. Go camping
Mechanics	35. Gunsmith
	45. Machinist
	49. Mechanic (automobile)
	84. Toolmaker
	87. Watchmaker
	311. Work mechanical puzzles
	320. Fix a leaky faucet
	322. Tinker with a broken sewing machine
	325. Build a model of a jet engine
	327. Take apart a mechanical toy and see how it works
	331. Tune-up a car
	332. Invent a new tool
	343. Change the oil in a car
	344. Rebuild a lawn-mower engine
	348. Adjust a carburetor
	384. How different types of engines work

Table A1

Items in A Priori Scales Based on Combined Data (Continued)

Scale		Items
Clerical	7.	Bank teller
	9.	Bookkeeper
	12.	Cashier in a bank
	18.	Court stenographer
	39.	Keypunch operator
	52.	Office worker
	67.	Purchasing agent
	72.	Shipping clerk
	76.	Stock clerk
	107.	Type letters
	114.	Make out invoices
	117.	Answer a telephone and give people information
	120.	Take dictation using shorthand
	122.	Sort mail
	373.	Bookkeeping
	380.	Efficient methods for filing and retrieving office records
Academic	215.	Organize and lead a study group
	266.	Take detailed notes from a lecture
	303.	Read poetry
	307.	Browse through a library
	309.	Visit a museum
	310.	Read a novel
	314.	Play bridge
	315.	See a Broadway play
	316.	Participate in a debate
	321.	Discuss a painting
	329.	Read Shakespeare's plays
	335.	Listen to an opera
	337.	Do crossword puzzles
	347.	Go to a symphony concert
	351.	Watch a ballet
	366.	Read books on future space flight

Table A2

Weights for A Priori Scales Selected for Weather Observer

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.4965	0.2044	Intercept		-0.4078	0.1793	Intercept		-0.4912	0.4912
Scale				Scale				Scale			
Scientific	0.4105	0.0243	0.0055	M-Scale	-0.4268	-0.0322	0.0055	Scientific	0.2937	0.0164	0.0037
M-Scale	-0.3143	-0.0238	0.0060	Scientific	0.2227	0.0126	0.0049	M-Scale	-0.3540	-0.0266	0.0043
Health Service	-0.2255	-0.0151	0.0049	Outdoors	0.2297	0.0160	0.0057	Outdoors	0.1528	0.0116	0.0046
Food Service	0.1644	0.0126	0.0049	Academic	0.1010	0.0066	0.0049	Electronic	-0.2647	-0.0140	0.0033
Electronic	-0.2681	-0.0140	0.0048	Electronic	-0.2280	-0.0121	0.0045	Computational	0.1801	0.0104	0.0034
Academic	0.1261	0.0086	0.0050	Pedagogy	0.2796	0.0230	0.0071	Health Service	-0.1499	-0.0097	0.0036
Clerical	-0.1625	-0.0113	0.0049	Leadership	-0.2697	-0.0237	0.0077	Food Service	0.1503	0.0109	0.0035
Computational	0.1981	0.0111	0.0047	Food Service	0.1233	0.0086	0.0049	Clerical	-0.1119	-0.0080	0.0039
Mechanics	0.1102	0.0064	0.0052	Health Service	-0.0938	-0.0060	0.0049	Academic	0.0961	0.0063	0.0034
Outdoors	0.0565	0.0050	0.0072	Mechanics	0.0918	0.0053	0.0050	Mechanics	0.1282	0.0074	0.0036
				Computational	0.0523	0.0030	0.0040	Pedagogy	0.1244	0.0101	0.0052
								Leadership	-0.1301	-0.0114	0.0063

Table A3

Weights for A Priori Scales Selected for Radio Relay Equipment Repairman

	Sample 1			Sample 2			Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.3274	0.1876	Intercept		-0.2874	0.1779	Intercept		-0.2962	0.1328
Scale				Scale				Scale			
Electronic	0.3881	0.0196	0.0036	Electronic	0.3381	0.0177	0.0035	Electronic	0.3576	0.0184	0.0026
M-Scale	-0.3581	-0.0264	0.0061	M-Scale	-0.3989	-0.0311	0.0054	M-Scale	-0.3851	-0.0291	0.0037
Scientific	0.2144	0.0125	0.0054	Outdoors	0.1984	0.0141	0.0050	Outdoors	0.1068	0.0079	0.0040
Pedagogy	-0.2347	-0.0179	0.0066	Leadership	-0.1618	-0.0135	0.0070	Scientific	0.1816	0.0100	0.0035
Computational	0.2336	0.0128	0.0045	Computational	0.1124	0.0065	0.0043	Pedagogy	-0.1211	-0.0093	0.0042
Clerical	-0.1889	-0.0133	0.0051	Scientific	0.1259	0.0070	0.0046	Computational	0.1899	0.0109	0.0034
Leadership	0.2358	0.0204	0.0089	Audiographic	-0.1020	-0.0066	0.0051	Clerical	-0.1159	-0.0081	0.0036
Audiographic	-0.1881	-0.0118	0.0049	Food Service	0.0720	0.0052	0.0049	Food Service	0.1304	0.0098	0.0035
Food Service	0.1700	0.0134	0.0052	Health Service	-0.0700	-0.0044	0.0048	Audiographic	-0.1403	-0.0089	0.0035
Health Service	-0.1287	-0.0085	0.0052					Health Service	-0.0958	-0.0062	0.0036
Outdoors	-0.0559	-0.0044	0.0058								

Table A4

Weights for A Priori Scales Selected for Aerospace Ground Equipment Repairman

	Sample 1			Sample 2			Combined		
	Standard Regression Weight	Regression Weights	Standard Error of Weight	Standard Regression Weight	Regression Weights	Standard Error of Weight	Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.5146	0.2084		-0.5362	0.1935		-0.5723	0.1457
Scale									
Electronic	0.2750	0.0129	0.0052	0.3944	0.0193	0.0038	0.2942	0.0141	0.0036
M-Scale	-0.1892	-0.0138	0.0067	-0.2534	-0.0184	0.0061	-0.3070	-0.0222	0.0046
Mechanics	0.2381	0.0131	0.0059	0.1963	0.0130	0.0060	0.1083	0.0059	0.0039
Pedagogy	-0.2046	-0.0149	0.0074	-0.1379	-0.0082	0.0056	0.1792	0.0122	0.0048
Food Service	0.2136	0.0159	0.0061	-0.0958	-0.0049	0.0051	-0.1408	-0.0084	0.0040
Health Service	-0.1832	-0.0113	0.0056	0.1599	0.0087	0.0054	0.1402	0.0098	0.0040
Computational	0.1453	0.0077	0.0049	-0.1108	-0.0079	0.0073	-0.0918	-0.0054	0.0041
Audiographic	-0.1589	-0.0096	0.0058	0.1012	0.0067	0.0054	0.1301	0.0070	0.0042
Outdoors	-0.1195	-0.0093	0.0075	-0.0803	-0.0047	0.0057	-0.1350	-0.0098	0.0051
Academic	0.1063	0.0066	0.0058				0.0563	0.0036	0.0040
							-0.0631	-0.0032	0.0041

Table A5

Weights for A Priori Scales Selected for Aircraft Maintenance Specialist - Jet Aircraft 1 & 2 Engine

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.4819	0.2299	Intercept		-0.4134	0.1827	Intercept		-0.4741	0.1432
Scale				Scale				Scale			
Mechanics	0.3752	0.0222	0.0042	Outdoors	0.3677	0.0242	0.0052	Mechanics	0.3089	0.0181	0.0041
M-Scale	-0.3086	-0.0240	0.0065	M-Scale	-0.3874	-0.0299	0.0059	M-Scale	-0.3617	-0.0277	0.0049
Food Service	0.1818	0.0145	0.0061	Mechanics	0.2874	0.0167	0.0058	Outdoors	0.2740	0.0196	0.0047
Academic	-0.1525	-0.0104	0.0056	Audiographic	-0.1338	-0.0081	0.0056	Academic	-0.1542	-0.0100	0.0040
Computational	0.1133	0.0064	0.0053	Computational	0.1169	0.0066	0.0050	Food Service	0.1070	0.0082	0.0042
Health Service	-0.0689	-0.0044	0.0055	Health Service	-0.0886	-0.0054	0.0047	Health Service	-0.1226	-0.0077	0.0040
Clerical	-0.0698	-0.0047	0.0060	Pedagogy	0.0968	0.0074	0.0073	Leadership	0.1003	0.0085	0.0058
Leadership	0.1036	0.0091	0.0103	Academic	-0.0639	-0.0040	0.0053	Electronic	-0.0760	-0.0039	0.0037
Pedagogy	-0.0813	-0.0063	0.0082	Electronic	-0.0702	-0.0036	0.0052	Scientific	0.0848	0.0046	0.0041
								Audiographic	-0.0563	-0.0035	0.0042

Table A6

Weights for A Priori Scales Selected for General Purpose Vehicle Repairman

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.2390	0.1654	Intercept		-0.2427	0.1667	Intercept		-0.1503	0.1188
Scale				Scale				Scale			
Mechanics	0.6057	0.0359	0.0041	Mechanics	0.4049	0.0236	0.0042	Mechanics	0.5166	0.0301	0.0036
M-Scale	-0.2678	-0.0200	0.0071	M-Scale	-0.3529	-0.0259	0.0054	M-Scale	-0.3847	-0.0285	0.0046
Outdoors	-0.2018	-0.0150	0.0062	Audiographic	-0.2722	-0.0160	0.0047	Audiographic	-0.2132	-0.0124	0.0038
Audiographic	-0.1648	-0.0096	0.0052	Outdoors	0.2961	0.0195	0.0049	Academic	-0.1395	-0.0087	0.0036
Leadership	0.2377	0.0197	0.0087	Health Service	-0.1260	-0.0077	0.0046	Leadership	0.1363	0.0114	0.0058
Pedagogy	-0.2670	-0.0198	0.0078	Pedagogy	0.1453	0.0112	0.0070	Outdoors	0.1338	0.0092	0.0042
Computational	0.1472	0.0080	0.0048	Academic	-0.1516	-0.0093	0.0049	Computational	0.0857	0.0049	0.0035
Academic	-0.0790	-0.0050	0.0055	Computational	0.1108	0.0063	0.0049	Health Service	-0.0677	-0.0042	0.0035
								Electronic	-0.0585	-0.0030	0.0034

Table A7

Weights for A Priori Scales Selected for General Accounting Specialist

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.5374	0.1853	Intercept		-0.3877	0.1549	Intercept		-0.5392	0.1140
Scale				Scale				Scale			
Computational	0.5860	0.0306	0.0039	Computational	0.5578	0.0303	0.0027	Computational	0.6070	0.0328	0.0026
M-Scale	-0.3789	-0.0288	0.0060	M-Scale	-0.3723	-0.0269	0.0043	M-Scale	-0.3186	-0.0236	0.0040
Electronic	-0.2107	-0.0107	0.0045	Electronic	-0.3228	-0.0164	0.0044	Electronic	-0.3039	-0.0154	0.0032
Mechanics	0.1256	0.0071	0.0050	Mechanics	0.1785	0.0099	0.0046	Mechanics	0.1509	0.0084	0.0034
Health Service	-0.1875	-0.0124	0.0044	Food Service	0.0908	0.0067	0.0039	Health Service	-0.1469	-0.0095	0.0031
Food Service	0.1193	0.0089	0.0046	Audiographic	-0.0847	-0.0053	0.0043	Food Service	0.0874	0.0065	0.0032
Outdoors	0.1185	0.0100	0.0060					Pedagogy	-0.1325	-0.0103	0.0045
Leadership	0.2287	0.0204	0.0078					Leadership	0.1112	0.0100	0.0054
Pedagogy	-0.2020	-0.0157	0.0065					Audiographic	-0.1017	-0.0065	0.0033
Audiographic	-0.0970	-0.0063	0.0049					Outdoors	0.0755	0.0056	0.0040
Academic	0.0764	0.0048	0.0044					Scientific	0.0740	0.0041	0.0032
Clerical	-0.0549	-0.0038	0.0047								

Table A8

Weights for A Priori Scales Selected for Administration Specialist

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.8471	0.2140	Intercept		-0.7064	0.2055	Intercept		-0.8098	0.1466
Scale				Scale				Scale			
Clerical	0.1523	0.0095	0.0052	Clerical	0.2354	0.0148	0.0061	Clerical	0.1762	0.0111	0.0041
M-Scale	-0.3403	-0.0236	0.0063	M-Scale	-0.2960	-0.0222	0.0067	M-Scale	-0.2502	-0.0182	0.0041
Food Service	0.2194	0.0169	0.0058	Audiographic	-0.1766	-0.0109	0.0052	Food Service	0.1521	0.0109	0.0040
Electronic	-0.1402	-0.0068	0.0052	Computational	0.2359	0.0129	0.0054	Audiographic	-0.1632	-0.0099	0.0036
Computational	0.1495	0.0082	0.0049	Food Service	0.0697	0.0047	0.0059	Computational	0.1958	0.0109	0.0040
Audiographic	-0.1746	-0.0104	0.0056	Scientific	-0.2338	-0.0127	0.0061	Academic	0.1247	0.0076	0.0039
Leadership	0.2078	0.0170	0.0098	Health Service	0.1327	0.0078	0.0057	Scientific	-0.1415	-0.0075	0.0044
Pedagogy	-0.1611	-0.0117	0.0077	Outdoors	0.0860	0.0059	0.0064	Pedagogy	-0.1169	-0.0087	0.0057
Academic	0.0900	0.0058	0.0055	Academic	0.1212	0.0073	0.0053	Leadership	0.0841	0.0069	0.0071
Mechanics	0.0614	0.0033	0.0056	Leadership	-0.0798	-0.0066	0.0093	Health Service	0.0556	0.0033	0.0040
				Mechanics	0.0475	0.0028	0.0048				

Table A9

Weights for A Priori Scales Selected for Security Specialist

	Sample 1			Sample 2			Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.5090	0.2300	Intercept		-0.4737	0.1929	Intercept		-0.5064	0.1500
Scale				Scale				Scale			
Clerical	0.1713	0.0094	0.0050	M-Scale	0.2554	0.0143	0.0063	Clerical	0.1325	0.0071	0.0043
Outdoors	-0.1452	-0.0104	0.0055	Electronic	-0.0714	-0.0027	0.0049	Electronic	-0.1476	-0.0059	0.0029
Food Service	0.1479	0.0101	0.0060	Health Service	0.2706	0.0125	0.0054	Leadership	-0.2144	-0.0147	0.0067
Pedagogy	-0.1588	-0.0101	0.0069	Leadership	-0.3364	-0.0214	0.0090	M-Scale	0.1068	0.0065	0.0041
Audiographic	0.1129	0.0059	0.0052	Clerical	0.1400	0.0070	0.0059	Computational	0.1218	0.0056	0.0039
Academic	-0.0789	-0.0043	0.0057	Scientific	-0.2658	-0.0110	0.0056	Food Service	0.0490	0.0030	0.0043
				Computational	0.1734	0.0075	0.0051	Scientific	-0.1508	-0.0065	0.0040
				Mechanics	-0.1206	-0.0052	0.0055	Health Service	0.0911	0.0046	0.0042
				Academic	0.0721	0.0035	0.0052	Audiographic	0.0938	0.0047	0.0043
				Food Service	-0.0778	-0.0044	0.0059				
				Outdoors	0.0590	0.0031	0.0059				

Table A10

Weights for Occupational Scale Items Selected for Weather Observer

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.4018	0.1275	Intercept		-0.4091	0.1252	Intercept		-0.4295	0.0849
Items				Items				Items			
386	0.1744	0.0993	0.0352	190	-0.1098	-0.0717	0.0410	386	0.0950	0.0555	0.0254
103	-0.1940	-0.1210	0.0381	394	-0.0224	-0.0128	0.0371	108	-0.2041	-0.1290	0.0255
169	0.2141	0.1259	0.0340	260	-0.1903	-0.1134	0.0318	302	0.1455	0.0856	0.0204
88	0.2053	0.1226	0.0327	182	0.1606	0.0970	0.0319	334	-0.1555	-0.1000	0.0213
43	-0.1232	-0.0748	0.0288	302	0.1216	0.0715	0.0277	374	0.1222	0.0666	0.0236
302	0.1310	0.0766	0.0294	334	-0.1570	-0.1021	0.0294	138	0.1423	0.0851	0.0238
224	-0.0785	-0.0458	0.0314	214	-0.1351	-0.0823	0.0356	214	-0.1744	-0.1076	0.0246
214	-0.1339	-0.0838	0.0350	88	0.0676	0.0400	0.0383	309	0.0901	0.0595	0.0231
337	0.1465	0.0897	0.0302	11	0.1588	0.1002	0.0281	259	-0.1736	-0.1049	0.0217
137	-0.1082	-0.0719	0.0323	374	0.1533	0.0842	0.0332	182	0.0798	0.0489	0.0231
112	-0.1120	-0.0696	0.0377	305	-0.1069	-0.0668	0.0310	151	0.0954	0.0558	0.0230
334	-0.0599	-0.0379	0.0298	5	0.0597	0.0343	0.0266	30	-0.0923	-0.0565	0.0209
390	0.0784	0.0466	0.0325	80	0.1285	0.0759	0.0291	390	0.0722	0.0438	0.0231
326	-0.0764	-0.0431	0.0289	31	-0.1143	-0.0710	0.0285	80	0.0725	0.0430	0.0204
95	-0.1053	-0.0622	0.0347	312	0.0697	0.0426	0.0288	104	0.0818	0.0471	0.0208
313	0.0952	0.0578	0.0393	138	0.1210	0.0727	0.0414	105	-0.1164	-0.0688	0.0255
40	0.0621	0.0371	0.0275	151	0.0851	0.0499	0.0304	340	0.0911	0.0530	0.0242
144	-0.0728	-0.0488	0.0349	109	-0.0685	-0.0438	0.0341				
307	0.0637	0.0384	0.0304	211	-0.0929	-0.0570	0.0340				
				375	0.0899	0.0534	0.0349				
				108	-0.0907	-0.0583	0.0402				
				50	0.0565	0.0322	0.0263				

Table A11

Weights for Occupational Scale Items Selected for Radio Relay Equipment Repairman

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.0136	0.1292	Intercept		-0.3274	0.1408	Intercept		-0.3400	0.0958
Items				Items				Items			
276	0.1441	0.0816	0.0492	276	0.1278	0.0755	0.0439	276	0.1697	0.0985	0.0350
108	-0.1415	-0.0899	0.0407	190	-0.1563	-0.1032	0.0444	108	-0.1618	-0.1031	0.0273
169	0.1871	0.1091	0.0414	394	0.1532	0.0889	0.0402	394	0.1094	0.0633	0.0279
2	-0.2098	-0.1295	0.0286	2	-0.1640	-0.0982	0.0279	2	-0.1830	-0.1109	0.0201
23	-0.1895	-0.1247	0.0312	302	0.1864	0.1067	0.0281	302	0.1555	0.0931	0.0206
302	0.1910	0.1176	0.0284	117	-0.0860	-0.0546	0.0316	117	-0.1099	-0.0715	0.0220
176	-0.1603	-0.1044	0.0305	374	0.2328	0.1290	0.0360	70	0.0638	0.0391	0.0229
128	-0.1212	-0.0689	0.0306	70	0.0939	0.0560	0.0354	374	0.1126	0.0611	0.0266
136	0.1657	0.1005	0.0438	108	-0.1112	-0.0713	0.0390	128	-0.0683	-0.0401	0.0224
195	-0.1557	-0.0919	0.0409	131	-0.0990	-0.0809	0.0413	190	-0.1065	-0.0708	0.0288
68	0.1002	0.0619	0.0386	214	-0.0954	-0.0581	0.0379	262	-0.1194	-0.0705	0.0250
374	0.1025	0.0546	0.0421	282	0.0820	0.0496	0.0407	68	0.1054	0.0651	0.0254
340	-0.1265	-0.0754	0.0362	340	-0.1188	-0.0701	0.0327	169	0.1210	0.0709	0.0274
338	0.1273	0.0745	0.0402	312	0.0683	0.0415	0.0294	340	-0.0870	-0.0515	0.0254
92	-0.1178	-0.0723	0.0360	22	0.0784	0.0459	0.0284	168	-0.0842	-0.0528	0.0228
151	0.1552	0.0903	0.0341	395	-0.0904	-0.0522	0.0327	283	0.0629	0.0493	0.0276
262	-0.1592	-0.0939	0.0384	92	0.0986	0.0587	0.0335	277	-0.1146	-0.0662	0.0279
291	0.0859	0.0546	0.0305	400	-0.1031	-0.0578	0.0354	336	0.0731	0.0428	0.0251
4	-0.0764	-0.0483	0.0295	140	0.0977	0.0564	0.0350	104	0.0609	0.0354	0.0207
394	0.1663	0.0960	0.0388	375	-0.0961	-0.0569	0.0376	60	-0.0490	-0.0285	0.0220
277	-0.1264	-0.0723	0.0392	320	0.0680	0.0420	0.0329	282	0.0924	0.0548	0.0307
371	-0.1171	-0.0698	0.0378					195	-0.0957	-0.0573	0.0292
82	0.0988	0.0639	0.0394					163	0.0908	0.0542	0.0315
190	-0.0759	-0.0509	0.0388								
282	0.1100	0.0642	0.0412								
313	-0.0873	-0.0519	0.0365								
311	0.0307	0.0185	0.0312								
36	0.1262	0.0757	0.0409								
60	-0.1234	-0.0736	0.0401								

Table A12

Weights for Occupational Scale Items Selected for Aerospace Ground Equipment Repairman

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.4118	0.1492	Intercept		-0.2494	0.1318	Intercept		-0.3717	0.0945
Items				Items				Items			
108	-0.2590	-0.1536	0.0431	267	0.2316	0.1259	0.0406	397	0.0822	0.0428	0.0278
322	0.0853	0.0450	0.0423	298	-0.1442	-0.0760	0.0318	108	-0.1870	-0.1106	0.0302
109	0.1763	0.0976	0.0365	190	-0.1581	-0.0941	0.0420	2	-0.1381	-0.0821	0.0231
144	-0.1833	-0.1120	0.0369	397	0.1187	0.0627	0.0384	267	0.2310	0.1273	0.0307
267	0.1923	0.1069	0.0431	176	-0.1233	-0.0734	0.0348	176	-0.1864	-0.1107	0.0243
312	0.0801	0.0442	0.0324	2	-0.1738	-0.1026	0.0340	312	0.1257	0.0711	0.0220
176	-0.2364	-0.1398	0.0369	35	0.1463	0.0807	0.0310	109	0.1667	0.0910	0.0244
230	0.0867	0.0468	0.0355	109	0.1803	0.0969	0.0371	144	-0.1584	-0.0961	0.0251
203	0.1054	0.0629	0.0377	400	0.1777	0.0908	0.0396	302	0.1090	0.0617	0.0229
2	-0.1384	-0.0819	0.0327	145	-0.2273	-0.1224	0.0449	190	-0.1181	-0.0716	0.0291
169	0.1391	0.0797	0.0343	43	0.1447	0.0837	0.0370	93	0.0884	0.0561	0.0275
25	0.0897	0.0519	0.0380	276	-0.1861	-0.0996	0.0525	25	0.0986	0.0578	0.0258
277	-0.1354	-0.0710	0.0472	195	0.2105	0.1171	0.0458	207	-0.1279	-0.0706	0.0369
202	0.1899	0.1037	0.0406	207	-0.2666	-0.1485	0.0506	104	0.1050	0.0566	0.0226
279	-0.2217	-0.1251	0.0443	210	-0.0993	-0.0540	0.0333	102	0.0995	0.0573	0.0275
331	0.1073	0.0622	0.0386	108	-0.1189	-0.0703	0.0403	202	0.1348	0.0744	0.0318
336	-0.0877	-0.0457	0.0422	104	0.0706	0.0382	0.0324	276	-0.1272	-0.0684	0.0363
190	-0.0866	-0.0536	0.0413	102	0.0572	0.0336	0.0390	145	-0.1180	-0.0629	0.0303
195	-0.2249	-0.1220	0.0518	82	0.1389	0.0793	0.0418	344	0.1124	0.0611	0.0282
164	0.0825	0.0457	0.0421	68	-0.1232	-0.0702	0.0409	163	0.0946	0.0511	0.0320
163	0.1229	0.0687	0.0495	384	0.1074	0.0613	0.0405	255	-0.0978	-0.0547	0.0326
294	-0.1548	-0.0859	0.0436	282	0.1223	0.0677	0.0508	279	-0.0716	-0.0406	0.0283
102	0.1356	0.0761	0.0429	136	-0.1200	-0.0651	0.0475				
320	0.0781	0.0459	0.0410	239	0.0929	0.0471	0.0407				
283	0.0760	0.0573	0.0470								
325	0.0646	0.0353	0.0375								
45	0.0960	0.0548	0.0386								
84	-0.0927	-0.0551	0.0425								

Table A13

Weights for Occupational Scale Items Selected for Aircraft Maintenance Specialist - Jet Aircraft 1 & 2 Engine

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.3060	0.1627	Intercept		-0.5465	0.1800	Intercept		-0.4941	0.1178
Items				Items				Items			
108	-0.2650	-0.1653	0.0444	190	-0.1841	-0.1164	0.0519	108	-0.2277	-0.1406	0.0298
209	0.2767	0.1604	0.0379	344	0.0486	0.0279	0.0470	275	0.0544	0.0330	0.0283
2	-0.1803	-0.1126	0.0330	71	0.0568	0.0320	0.0377	2	-0.1540	-0.0940	0.0237
299	0.1956	0.1140	0.0364	312	0.0998	0.0592	0.0366	47	0.0904	0.0557	0.0252
104	0.1638	0.0930	0.0335	176	-0.1291	-0.0791	0.0396	331	0.0844	0.0522	0.0307
176	-0.1663	-0.1041	0.0376	125	0.0799	0.0550	0.0460	214	-0.1096	-0.0653	0.0306
283	0.1433	0.1107	0.0449	333	0.1109	0.0798	0.0453	328	0.1358	0.0812	0.0244
128	-0.1532	-0.0866	0.0308	108	-0.1652	-0.1012	0.0445	104	0.1010	0.0569	0.0228
132	0.1067	0.0702	0.0409	101	0.0982	0.0719	0.0478	176	-0.1575	-0.0974	0.0255
190	-0.0134	-0.0087	0.0481	47	0.1063	0.0635	0.0391	133	0.0677	0.0431	0.0290
344	-0.2075	-0.1188	0.0495	362	0.0670	0.0490	0.0449	390	0.0706	0.0411	0.0248
343	0.1277	0.0777	0.0481	94	0.1566	0.0922	0.0437	205	-0.1320	-0.0749	0.0278
136	0.1714	0.1008	0.0434	2	-0.1126	-0.0678	0.0360	343	0.0930	0.0569	0.0310
279	-0.1469	-0.0876	0.0430	291	0.0754	0.0426	0.0360	291	0.0722	0.0422	0.0250
291	0.0876	0.0527	0.0381	99	-0.1160	-0.0703	0.0373	101	0.0780	0.0614	0.0336
84	-0.1554	-0.0941	0.0416	49	-0.1269	-0.0785	0.0486	209	0.0905	0.0534	0.0276
45	0.1033	0.0636	0.0412	25	0.0883	0.0543	0.0395	177	-0.0870	-0.0545	0.0304
331	0.1595	0.0994	0.0488	200	0.0740	0.0425	0.0380	312	0.0574	0.0335	0.0235
214	-0.0803	-0.0493	0.0460	390	0.0997	0.0590	0.0379	190	-0.0797	-0.0512	0.0345
47	0.0588	0.0373	0.0375	35	0.0679	0.0395	0.0351	283	0.0622	0.0474	0.0331
145	-0.0989	-0.0549	0.0413	322	-0.1016	-0.0575	0.0426				
133	0.1069	0.0704	0.0439	214	-0.0715	-0.0413	0.0440				
348	-0.1069	-0.0658	0.0546	132	-0.0752	-0.0472	0.0436				
266	-0.0777	-0.0556	0.0415	275	0.0748	0.0448	0.0447				
275	-0.1136	-0.0695	0.0472								
202	0.1156	0.0678	0.0426								
296	-0.0732	-0.0451	-0.0439								
397	-0.1122	-0.0626	0.0440								
400	0.0900	0.0502	0.0367								

Table A14

Weights for Occupational Scale Items Selected for General Purpose Vehicle Repairman

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.4231	0.1496	Intercept		-0.2342	0.1153	Intercept		-0.2236	0.0998
Items				Items				Items			
291	0.1647	0.0933	0.0352	148	0.0811	0.0446	0.0483	291	0.1631	0.0905	0.0226
108	-0.0963	-0.0594	0.0414	2	-0.1749	-0.1003	0.0295	2	-0.1516	-0.0866	0.0210
209	0.1507	0.0844	0.0338	45	0.1752	0.1026	0.0336	190	-0.1805	-0.1143	0.0269
2	-0.0820	-0.0471	0.0318	190	-0.1621	-0.1006	0.0317	135	0.1464	0.0819	0.0269
144	-0.1577	-0.0995	0.0341	267	0.2177	0.1238	0.0327	218	-0.1390	-0.0820	0.0242
344	0.0567	0.0332	0.0483	83	-0.1911	-0.1114	0.0309	209	0.1528	0.0869	0.0238
190	-0.1355	-0.0875	0.0411	218	-0.2375	-0.1397	0.0308	83	-0.1277	-0.0740	0.0215
28	0.1136	0.0901	0.0387	205	-0.2645	-0.1486	0.0372	45	0.1395	0.0826	0.0251
14	-0.0684	-0.0484	0.0365	279	0.1574	0.0940	0.0343	267	0.1542	0.0882	0.0245
205	-0.2046	-0.1167	0.0382	71	0.1049	0.0602	0.0329	205	-0.1820	-0.1030	0.0272
271	0.1834	0.0993	0.0344	400	0.1486	0.0779	0.0283	108	-0.0731	-0.0443	0.0265
89	0.1111	0.0626	0.0360	145	-0.1990	-0.1099	0.0359	145	-0.1364	-0.0757	0.0254
3	-0.1137	-0.0654	0.0291	135	0.1665	0.0928	0.0422	344	0.1190	0.0687	0.0300
45	0.1432	0.0861	0.0372	209	0.1213	0.0705	0.0325	71	0.0681	0.0398	0.0243
133	0.1171	0.0763	0.0345	88	-0.0953	-0.0544	0.0298	271	0.0679	0.0367	0.0246
176	-0.0940	-0.0593	0.0377	49	-0.1271	-0.0788	0.0392	49	-0.1064	-0.0671	0.0283
145	-0.1786	-0.1000	0.0365	224	0.1419	0.0818	0.0366	155	0.0935	0.0554	0.0320
202	0.1248	0.0715	0.0316	291	0.1119	0.0612	0.0295	176	-0.0958	-0.0599	0.0257
290	0.0669	0.0418	0.0359	359	-0.0928	-0.0519	0.0279	283	0.0679	0.0523	0.0295
296	-0.0777	-0.0477	0.0402	90	0.1233	0.0688	0.0309	351	-0.0617	-0.0444	0.0261
318	-0.1016	-0.0623	0.0349	386	-0.0820	-0.0438	0.0295	90	0.0857	0.0480	0.0228
331	0.1244	0.0778	0.0480	348	0.0793	0.0485	0.0356	386	-0.0650	-0.0347	0.0214
90	0.0572	0.0321	0.0319	17	-0.0702	-0.0406	0.0306				
84	-0.0770	-0.0459	0.0364								
322	0.0796	0.0448	0.0358								
238	-0.0728	-0.0464	0.0387								
254	0.0732	0.0417	0.0356								

Table A15

Weights for Occupational Scale Items Selected for General Accounting Specialist

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.4993	0.1072	Intercept		-0.4359	0.1058	Intercept		-0.5021	0.0797
Items				Items				Items			
1	0.2957	0.1676	0.0266	1	0.2365	0.1355	0.0259	1	0.2727	0.1555	0.0199
108	-0.2508	-0.1619	0.0307	190	-0.1191	-0.0785	0.0333	190	-0.1330	-0.0894	0.0282
273	0.1793	0.1025	0.0303	201	0.1903	0.1115	0.0356	201	0.0961	0.0553	0.0277
302	0.2238	0.1375	0.0241	259	-0.1699	-0.1029	0.0279	302	0.1296	0.0798	0.0173
26	-0.1355	-0.0837	0.0248	334	-0.1384	-0.0855	0.0251	259	-0.0754	-0.0450	0.0195
67	0.1202	0.0727	0.0265	374	0.1156	0.0651	0.0238	26	-0.0820	-0.0506	0.0188
160	-0.1080	-0.0673	0.0250	119	-0.1241	-0.0727	0.0248	169	0.1631	0.0932	0.0233
151	0.1073	0.0628	0.0257	214	-0.1146	-0.0713	0.0307	214	-0.0914	-0.0579	0.0244
43	-0.1084	-0.0664	0.0251	151	0.1102	0.0650	0.0270	151	0.1259	0.0741	0.0196
150	-0.1807	-0.1103	0.0333	83	-0.1091	-0.0650	0.0253	305	-0.0981	-0.0621	0.0188
247	0.1329	0.0743	0.0303	67	0.0500	0.0298	0.0258	67	0.1028	0.0618	0.0202
337	0.1202	0.0739	0.0254	139	-0.1380	-0.0817	0.0320	105	-0.1065	-0.0611	0.0228
40	-0.0609	-0.0376	0.0259	74	0.1297	0.0767	0.0293	187	0.0776	0.0432	0.0229
190	-0.0753	-0.0516	0.0340	280	0.1035	0.0629	0.0277	54	-0.0900	-0.0533	0.0196
156	-0.1325	-0.0777	0.0304	187	0.1230	0.0688	0.0301	74	0.1046	0.0627	0.0210
169	0.1136	0.0635	0.0294	305	-0.0795	-0.0509	0.0275	139	-0.0907	-0.0534	0.0234
380	-0.0958	-0.0531	0.0267	91	-0.1088	-0.0646	0.0289	247	0.1320	0.0755	0.0257
379	0.0806	0.0447	0.0263	166	0.0894	0.0530	0.0293	206	-0.0805	-0.0498	0.0208
				80	0.0660	0.0382	0.0235	337	0.0682	0.0409	0.0183
								150	-0.0605	-0.0375	0.0233
								43	-0.0682	-0.0430	0.0200
								108	-0.0662	-0.0427	0.0246
								166	0.0904	0.0544	0.0262
								156	-0.0871	-0.0517	0.0258

Table A16

Weights for Occupational Scale Items Selected for Administration Specialist

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.7599	0.1453	Intercept		-0.6753	0.1727	Intercept		-0.9750	0.1176
Items				Items				Items			
247	0.1333	0.0768	0.0267	18	0.2145	0.1427	0.0371	9	0.0922	0.0536	0.0258
108	-0.3741	-0.2272	0.0315	2	-0.1279	-0.0798	0.0345	108	-0.2450	-0.1481	0.0302
304	0.2710	0.1717	0.0343	9	0.0946	0.0542	0.0352	286	0.1298	0.0748	0.0249
35	-0.1136	-0.0645	0.0336	190	-0.1719	-0.1062	0.0359	18	0.1513	0.1034	0.0284
8	0.1642	0.1249	0.0414	302	0.1336	0.0785	0.0331	283	0.1321	0.1025	0.0366
122	0.0843	0.0538	0.0350	187	0.1476	0.0867	0.0351	110	-0.1275	-0.0689	0.0231
368	-0.1103	-0.0604	0.0313	130	-0.1556	-0.1037	0.0377	302	0.0998	0.0596	0.0257
82	-0.1583	-0.0887	0.0309	110	-0.0688	-0.0373	0.0311	304	0.1674	0.1031	0.0273
379	0.1869	0.0975	0.0312	28	0.1431	0.1044	0.0399	327	-0.0935	-0.0531	0.0263
78	0.1194	0.0859	0.0443	284	0.1528	0.0847	0.0302	8	0.1169	0.0848	0.0305
26	-0.1215	-0.0690	0.0312	97	-0.1710	-0.0984	0.0352	190	-0.1481	-0.0927	0.0309
201	-0.1838	-0.1092	0.0413	325	-0.1429	-0.0807	0.0342	12	-0.1159	-0.0724	0.0288
1	0.1628	0.0876	0.0307	286	0.1134	0.0645	0.0345	16	0.0874	0.0534	0.0271
98	0.1020	0.0836	0.0470	33	-0.1051	-0.0637	0.0335	391	-0.1041	-0.0588	0.0248
327	-0.0707	-0.0388	0.0327	314	0.0785	0.0516	0.0365	382	0.0889	0.0499	0.0230
				16	0.1117	0.0681	0.0360	234	0.1017	0.0617	0.0255
				52	-0.1059	-0.0628	0.0361	270	-0.1377	-0.0910	0.0315
				80	0.0870	0.0488	0.0333	30	-0.0618	-0.0360	0.0235
				290	-0.0760	-0.0446	0.0342	93	0.0837	0.0568	0.0298
				398	0.1165	0.0757	0.0411	187	0.0974	0.0578	0.0272
				7	-0.0772	-0.0463	0.0367	308	-0.0631	-0.0376	0.0262
				391	-0.0947	-0.0548	0.0390	122	0.0694	0.0423	0.0261
				60	-0.0696	-0.0384	0.0314	263	-0.0979	-0.0575	0.0293
								151	0.0748	0.0424	0.0262
								299	-0.0520	-0.0286	0.0260
								20	-0.0666	-0.0432	0.0276
								52	0.0697	0.0408	0.0265
								361	0.0648	0.0416	0.0288

Table A17

Weights for Occupational Scale Items Selected for Security Specialist

Sample 1				Sample 2				Combined			
	Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight		Standard Regression Weight	Regression Weights	Standard Error of Weight
Intercept		-0.5072	0.2588	Intercept		-0.8464	0.1451	Intercept		-0.5178	0.1430
Items				Items				Items			
122	0.1312	0.0734	0.0461	19	0.1655	0.0735	0.0292	19	0.2031	0.0979	0.0239
285	-0.2074	-0.1224	0.0388	83	-0.1684	-0.0782	0.0300	2	-0.1778	-0.0924	0.0248
304	0.2366	0.1322	0.0392	125	0.0587	0.0314	0.0369	334	-0.1863	-0.1021	0.0262
254	-0.2715	-0.1336	0.0362	334	-0.1502	-0.0815	0.0351	304	0.1853	0.0953	0.0264
306	0.2085	0.1067	0.0386	39	0.1350	0.0618	0.0292	108	-0.1592	-0.0788	0.0265
334	-0.1423	-0.0776	0.0341	219	-0.3024	-0.1363	0.0329	8	0.1045	0.0678	0.0312
2	-0.0858	-0.0455	0.0353	321	0.1553	0.0783	0.0318	101	0.1094	0.0746	0.0316
8	0.1291	0.0905	0.0459	89	-0.1533	-0.0669	0.0289	151	0.1516	0.0697	0.0338
26	-0.2003	-0.0976	0.0339	302	0.1711	0.0774	0.0297	327	-0.0595	0.0276	0.0262
113	0.1769	0.0888	0.0350	378	0.1691	0.0778	0.0357	60	0.1548	0.0704	0.0220
213	-0.0914	-0.0462	0.0337	214	-0.2188	-0.0970	0.0290	302	0.0877	0.0440	0.0262
71	0.1329	0.0719	0.0340	64	0.2242	0.1141	0.0327	90	-0.1148	-0.0519	0.0235
40	0.1234	0.0618	0.0377	101	0.1491	0.0911	0.0397	61	-0.1134	-0.0537	0.0240
203	0.1549	0.0867	0.0464	116	-0.2035	-0.0922	0.0300	18	0.1038	0.0640	0.0306
61	0.1063	0.0513	0.0345	290	0.1603	0.0732	0.0344	285	-0.0779	-0.0472	0.0300
131	-0.1031	-0.0701	0.0542	2	-0.1601	-0.0806	0.0297	378	0.1238	0.0582	0.0261
264	-0.1421	-0.0789	0.0443	218	-0.1504	-0.0675	0.0305	299	-0.1017	-0.0459	0.0255
328	0.1152	0.0596	0.0390	54	0.1733	0.0756	0.0277	377	-0.1086	-0.0481	0.0236
190	-0.0522	-0.0281	0.0410	385	0.1617	0.0695	0.0333	203	0.1097	0.0565	0.0289
174	0.1088	0.0514	0.0379	368	0.1623	0.0701	0.0273	270	-0.1207	-0.0680	0.0331
206	-0.1001	-0.0512	0.0431	325	-0.1120	-0.0473	0.0302	96	-0.0959	-0.0469	0.0262
352	-0.0714	-0.0527	0.0485	60	0.1096	0.0457	0.0270	58	-0.0705	-0.0343	0.0240
39	-0.1695	-0.0870	0.0410	390	-0.0885	-0.0389	0.0297	206	-0.1160	-0.0574	0.0328
58	-0.0715	-0.0365	0.0360	283	0.1140	0.0707	0.0451	174	0.1145	0.0523	0.0324
19	0.0765	0.0398	0.0354	209	-0.0831	-0.0377	0.0337	250	-0.1296	-0.0627	0.0316
292	0.1222	0.0751	0.0534	107	-0.0747	-0.0351	0.0314	196	0.0864	0.0449	0.0343
250	0.0911	0.0467	0.0450	18	0.0622	0.0366	0.0339	21	-0.0794	-0.0506	0.0329
18	0.0810	0.0511	0.0450					122	0.0945	0.0489	0.0319
108	-0.0921	-0.0483	0.0415					324	0.0747	0.0407	0.0295
179	-0.0287	-0.0358	0.0919					247	-0.0863	-0.0442	0.0330
110	-0.0622	-0.0285	0.0327					39	0.0741	0.0364	0.0265
377	-0.0632	-0.0300	0.0339					328	0.0705	0.0341	0.0270
9	0.0590	0.0322	0.0397								
201	-0.0704	-0.0367	0.0475								
63	-0.0415	-0.0244	0.0395								
28	0.0420	0.0290	0.0480								
380	0.0987	0.0459	0.0446								
263	-0.1073	-0.0559	0.0547								

Table A18

Items in Occupational Scales Based on Combined Data

Scale		Items
Weather Observer	386.	Meteorology
	108.	March in a parade
	302.	Plant and take care of a vegetable garden
	334.	Watch drag racing
	374.	Calculus
	138.	Make weather forecasts
	214.	Organize a military drill team
	309.	Visit a museum
	259.	Install a telephone
	182.	Help write questions for a test
	151.	Write a computer program
	30.	Fire fighter
	390.	Navigation of boats
	80.	Teacher
	104.	Draw blueprints for a bridge
	105.	Construct mathematical tables
	340.	Solve geometry problems
Radio Relay Repairman	276.	Find and replace defective transistors
	108.	March in a parade
	394.	Physics
	2.	Air Force officer
	302.	Plant and take care of a vegetable garden
	117.	Answer a telephone and give people information
	70.	Scientist
	374.	Calculus
	128.	Arrest a traffic violator
	190.	Take part in a military drill
	262.	Perform maintenance on a computer
	68.	Radio mechanic
	169.	Use a table of logarithms to solve a mathematics problem
	340.	Solve geometry problems
	168.	Sell automobiles
	283.	Varnish floors
	277.	Plan an electrical system for a house
	336.	Tinker with old radios
	104.	Draw blueprints for a bridge
	60.	Policeman
	282.	Test television tubes
	195.	Repair household electrical appliances
	163.	Find a problem in an electric circuit and fix it
Ground Equipment Repairman	397.	Refrigeration systems
	108.	March in a parade
	2.	Air Force officer
	267.	Use a voltmeter
	176.	Write letters
	312.	Go for a 20-mile hike
	109.	Assemble circuit boards for television sets on a production line
	144.	Help rescue someone from a fire
	302.	Plant and take care of a vegetable garden
	190.	Take part in a military drill
	93.	Upholster chairs
	25.	Electrician
	207.	Install electrical outlets in a building
	104.	Draw blueprints for a bridge
	102.	Splice cables
	202.	Install an air-conditioning system
	276.	Find and replace defective transistors
	145.	Rewire the electrical system in a car
	344.	Rebuild a lawn-mower engine
	163.	Find a problem in an electric circuit and fix it
	255.	Plan installation of a heating system
	279.	Use a soldering iron
Aircraft Maintenance	108.	March in a parade
	275.	Fix a broken lock
	2.	Air Force officer
	47.	Mason
	331.	Tune-up a car
	214.	Organize a military drill team
	328.	Buy food for a cookout
	104.	Draw blueprints for a bridge
	176.	Write letters
	133.	Help load cartons onto trucks
	390.	Navigation of boats
	205.	Dismantle large machines with hand tools
	343.	Change the oil in a car
	291.	Set up and operate a milling machine
	101.	Dig a ditch
	209.	Supervise work in a garage
	177.	Pour concrete for highway construction
	312.	Go for a 20-mile hike
	190.	Take part in a military drill
	283.	Varnish floors

Table A18

Items in Occupational Scales Based on Combined Data (Continued)

Scale		Items
Vehicle Repairman	291.	Set up and operate a milling machine
	2.	Air Force officer
	190.	Take part in a military drill
	135.	Perform routine maintenance on farm tractors
	218.	Record speeches with a cassette recorder
	209.	Supervise work in a garage
	83.	Television cameraman
	45.	Machinist
	267.	Use a voltmeter
	205.	Dismantle large machines with hand tools
	108.	March in a parade
	145.	Rewire the electrical system in a car
	344.	Rebuild a lawn-mower engine
	71.	Sheetmetal worker
	271.	Measure meachanical parts to determine wear
	49.	Mechanic (automobile)
	155.	Adjust the brakes on an automobile
	176.	Write letters
	283.	Varnish floors
	351.	Watch a ballet
	90.	Writer
	386.	Meteorology
Accounting Specialist	1.	Accountant
	190.	Take part in a military drill
	201.	Prepare a monthly financial statement for a company
	302.	Plant and take care of a vegetable garden
	259.	Install a telephone
	26.	Engineer (locomotive)
	169.	Use a table of logarithms to solve a mathematics problem
	214.	Organize a military drill team
	151.	Write a computer program
	305.	Write articles for automobile magazines
	67.	Purchasing agent
	105.	Construct mathematical tables
	187.	Prepare income tax returns for other people
	54.	Personnel manager
	74.	Statistician
	139.	Compile statistical tables
	247.	Keep detailed records of expenses for a clothing store
	206.	Take inventory for a department store
	337.	Do crossword puzzles
	150.	Balance a checkbook
	43.	Lineman (electric company)
	108.	March in a parade
	166.	Work with numbers
	156.	Solve arithmetic problems
Administration Specialist	9.	Bookkeeper
	108.	March in a parade
	286.	Increase your typing speed
	18.	Court stenographer
	283.	Varnish floors
	110.	Clear stumps and brush with a bulldozer
	302.	Plant and take care of a vegetable garden
	304.	Do volunteer work
	327.	Take apart a mechanical toy and see how it works
	8.	Barber
	190.	Take part in a military drill
	12.	Cashier in a bank
	16.	Computer programmer
	391.	Nuclear reactors
	382.	Foreign languages
	234.	Manage a cafeteria
	270.	Prepare a written summary of a telephone conversation
	30.	Fire fighter
	93.	Upholster chairs
	187.	Prepare income tax returns for other people
	308.	Build a model airplane
	122.	Sort mail
	263.	Organize a file system for an office
	151.	Write a computer program
	299.	Inspect aircraft for defective parts
	20.	Dental hygienist
	52.	Office worker
	361.	Collect and classify insects

Table A18

Items in Occupational Scales Based on Combined Data (Continued)

Scale		Items
Security Specialist	19.	Customs agent
	2.	Air Force officer
	334.	Watch drag racing
	304.	Do volunteer work
	108.	March in a parade
	8.	Barber
	101.	Dig a ditch
	151.	Write a computer program
	327.	Take apart a mechanical toy and see how it works
	60.	Policeman
	302.	Plant and take care of a vegetable garden
	90.	Writer
	61.	Postman
	18.	Court stenographer
	285.	Learn more about your job by going to school
	378.	Disease prevention
	299.	Inspect aircraft for defective parts
	377.	Classical music
	203.	Operate a printing press
	270.	Prepare a written summary of a telephone conversation
	96.	Install a radio in a car
	58.	Pilot
	206.	Take inventory for a department store
	174.	Find the errors in a computer program
	250.	Operate a machine that sorts punched cards
	196.	Supervise an inventory of textile goods
	21.	Dietitian
	122.	Sort mail
	324.	Improve a recipe
	247.	Keep detailed records of expenses for a clothing store
	39.	Keypunch operator
	328.	Buy food for a cookout

Table A19

Means (M) and Standard Deviations (σ) for All Final Scales

	Weather Observer				Radio Relay Repairman				Ground Equipment Repairman				Aircraft Maintenance			
	Satisfied		Dissatisfied		Satisfied		Dissatisfied		Satisfied		Dissatisfied		Satisfied		Dissatisfied	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
Audiographic	52.707	9.101	50.093	9.038	53.013	9.568	50.609	10.134	51.338	9.809	50.582	9.281	50.777	9.938	50.836	10.106
Food Service	51.821	10.904	51.391	10.127	50.506	10.150	49.400	9.448	51.172	10.681	49.775	9.787	50.436	9.446	49.191	9.645
Pedagogy	53.542	8.315	50.898	10.135	50.275	10.144	47.774	9.977	49.737	9.922	48.386	9.533	49.502	9.561	48.416	10.115
M-Scale	49.588	9.378	45.603	9.396	49.420	9.128	46.109	7.856	52.972	9.555	50.516	9.820	53.837	9.336	51.168	9.858
Leadership	50.630	9.390	47.911	9.681	49.089	10.057	46.179	9.272	51.052	10.365	48.735	9.910	51.012	9.763	48.828	9.997
Computational	52.819	8.925	48.687	9.833	52.199	9.225	49.229	9.695	49.597	9.812	49.846	9.594	47.911	9.102	47.506	9.789
Health Service	51.897	9.289	51.502	10.104	50.317	9.522	47.970	8.415	49.555	9.962	50.064	9.840	49.510	9.699	49.505	9.973
Scientific	55.302	8.105	52.691	9.203	54.106	8.958	51.252	9.086	49.304	10.052	50.352	10.030	48.866	9.527	48.721	10.366
Electronic	49.493	9.024	46.211	9.570	57.288	7.662	52.551	9.574	55.657	8.347	52.602	9.781	52.599	8.690	51.100	9.698
Mechanics	49.335	9.630	46.332	10.356	52.951	8.746	49.976	9.879	54.720	8.798	50.210	9.176	54.919	8.059	52.666	9.357
Clerical	50.328	9.018	45.905	8.569	48.323	9.278	47.044	9.082	50.942	10.570	49.018	9.528	49.668	9.673	48.675	9.831
Outdoors	50.422	8.762	49.306	9.884	51.595	9.328	49.719	9.927	52.880	9.662	50.219	9.617	54.215	9.208	52.677	9.229
Academic	54.541	8.621	54.470	9.580	50.867	9.523	49.629	9.329	48.911	10.303	48.736	9.638	47.477	9.046	47.695	9.237
Weather Observer	57.935	7.271	54.779	8.817	52.021	9.108	51.120	9.475	47.748	9.631	49.165	9.603	47.769	8.660	48.006	10.611
Radio Relay Repairman	51.739	9.279	52.651	9.005	57.938	7.991	56.122	9.518	51.033	9.181	51.886	9.472	49.033	9.635	49.898	9.278
Ground Equipment Repairman	48.961	9.347	48.354	9.371	52.673	9.421	52.272	9.716	56.646	8.055	53.180	8.566	52.134	10.211	53.194	9.641
Aircraft Maintenance	49.495	9.651	48.906	9.915	52.450	9.523	50.718	9.910	52.195	9.123	50.831	9.319	54.806	8.908	53.549	9.847
Vehicle Repairman	45.267	8.052	47.060	8.553	50.980	8.543	50.947	8.022	54.478	9.276	51.239	8.511	54.167	9.440	54.999	10.565
Accounting Specialist	52.152	9.137	52.807	8.886	49.440	9.461	50.474	8.278	45.471	8.976	49.037	8.635	45.410	8.136	47.305	8.707
Administration Specialist	51.631	9.237	49.666	9.414	48.391	8.879	48.278	8.813	48.433	9.242	50.432	9.719	46.061	9.236	48.278	10.138
Security Specialist	49.787	9.301	51.011	9.817	47.967	9.985	50.185	9.243	49.194	9.184	51.644	9.101	48.632	9.720	51.394	11.076
Job Satisfaction	58.258	6.248	41.783	5.907	58.550	5.203	43.025	6.223	57.878	4.898	42.529	6.623	58.011	5.048	43.676	5.547
Peer Satisfaction	55.905	7.177	50.019	9.479	53.054	7.988	49.156	10.368	49.211	8.893	46.250	10.015	51.838	8.455	46.859	9.152
Supervision	37.663	7.755	29.492	9.837	36.924	8.126	30.007	9.705	32.889	9.122	26.072	9.185	34.544	8.647	27.022	9.940
Air Force	55.372	7.913	46.746	9.798	54.938	7.368	46.388	9.816	53.381	8.792	46.330	8.666	52.611	8.736	44.533	9.335

Means (M) and Standard Deviations (σ) for All Final Scales (Continued)

Vehicle Repairman				Accounting Specialist				Administration Specialist				Security Specialist				Men-In-General	
Satisfied		Dissatisfied		Satisfied		Dissatisfied		Satisfied		Dissatisfied		Satisfied		Dissatisfied			
M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
46.645	11.136	46.479	11.088	49.277	9.960	48.022	9.366	49.501	10.308	47.676	9.146	50.371	10.831	51.179	9.760	50.264	9.952
47.527	9.781	47.424	9.732	50.718	10.402	49.763	9.208	52.638	10.587	47.812	9.307	50.138	9.864	49.528	9.388	49.033	9.410
46.788	9.533	46.156	10.456	53.134	9.827	51.255	9.211	52.180	10.291	48.564	9.983	50.425	9.958	50.487	10.081	50.477	10.584
51.995	9.848	50.452	11.213	48.632	9.552	46.372	9.213	51.730	10.241	49.171	9.911	55.943	10.410	52.241	9.784	55.302	10.041
48.821	9.979	46.729	9.980	53.676	9.121	50.867	8.848	54.166	10.445	49.272	9.874	52.031	10.329	50.901	10.216	51.978	10.047
45.416	9.295	44.358	9.416	57.774	8.562	45.920	8.125	51.938	9.566	47.679	10.056	49.393	10.348	48.497	9.660	48.082	9.242
46.845	9.571	46.717	9.855	49.646	9.757	49.325	9.665	52.703	10.983	50.012	11.066	52.077	9.564	51.828	10.429	51.053	10.387
45.499	10.318	45.960	10.383	50.878	9.462	49.806	9.348	48.840	10.177	46.731	9.698	47.930	10.611	49.232	10.155	48.824	9.838
51.562	9.170	49.825	9.908	45.802	9.813	43.129	9.381	47.421	9.490	46.407	9.912	47.596	10.787	50.116	9.697	49.546	10.189
56.120	7.495	53.023	9.055	46.301	10.287	45.285	9.523	47.758	9.609	45.562	9.839	48.565	10.541	49.607	9.834	49.848	9.550
47.637	9.953	45.735	9.009	56.190	8.738	49.623	8.637	57.166	10.287	49.404	9.675	53.594	11.249	51.241	10.300	50.939	9.747
51.664	10.431	49.924	11.701	46.360	9.120	46.944	9.524	47.306	9.474	46.877	10.558	49.686	10.222	51.826	9.972	50.099	9.572
44.427	9.268	44.103	8.652	52.166	10.042	52.774	9.566	52.021	10.355	47.962	9.948	49.126	9.741	50.377	9.918	49.294	9.976
42.679	9.586	44.309	9.249	53.501	9.461	53.298	8.630	48.011	9.019	47.217	9.358	46.163	9.715	48.358	9.638	42.958	8.405
47.254	8.895	48.480	10.043	47.776	9.310	49.906	8.915	43.730	8.773	45.942	9.434	41.521	9.004	48.740	10.492	40.171	8.725
52.760	8.940	51.200	9.867	45.847	8.866	47.216	9.335	44.537	9.911	46.628	9.789	44.944	10.424	50.027	10.521	41.124	8.448
53.109	9.085	51.593	9.928	46.933	9.304	47.615	9.473	45.875	9.506	45.519	9.769	45.630	10.512	50.337	10.539	41.463	8.981
60.015	7.834	56.731	10.138	45.269	8.232	46.530	8.621	45.117	9.808	46.017	8.812	45.267	10.129	49.210	9.790	42.790	8.288
43.455	8.630	45.348	8.238	60.826	8.226	57.375	8.994	49.686	9.113	48.355	9.859	45.493	9.676	47.848	8.950	40.473	8.480
44.362	10.191	44.584	10.047	55.942	8.955	53.233	9.018	55.818	9.008	50.570	10.064	49.880	10.558	50.554	9.620	41.911	8.730
47.084	10.250	47.586	9.804	47.918	9.374	50.546	10.123	51.711	10.329	50.272	10.424	57.045	8.882	52.101	10.001	42.012	8.622
58.968	6.044	43.027	6.192	58.573	6.120	42.202	5.804	59.008	5.693	43.204	6.047	55.607	4.635	39.263	5.753		
51.410	9.009	44.715	10.155	53.720	9.025	48.497	10.575	52.838	10.923	46.758	10.658	48.440	8.529	47.440	10.872		
33.985	9.141	26.856	9.676	38.268	8.659	31.030	9.720	37.894	8.354	34.210	8.772	35.299	8.953	28.480	10.133		
51.163	10.157	43.757	8.979	54.775	8.256	45.495	9.395	55.959	9.308	49.634	9.706	52.944	8.863	45.928	9.947		

Table A20

Discriminant Function Weights for Thirteen A Priori Scales

Scales	First Function	Second Function	Third Function	Fourth Function	Fifth Function	Sixth Function	Seventh Function	Eighth Function	Ninth Function	Tenth Function	Eleventh Function	Twelfth Function	Thirteenth Function
Audiographic	.0036	.0767	.0418	-.1154	-.0338	-.0628	.0363	.0444	.0145	.0044	.0064	-.0270	-.0100
Food Service	.0731	.0977	-.0216	.0498	-.0184	.0653	.0026	-.0181	.0744	.0015	.0178	-.0028	.0044
Pedagogy	-.0119	-.0248	.0636	-.0038	-.0706	.0184	.0276	-.0295	-.0370	.0353	.0280	-.0120	.0165
M-Scale	-.0813	-.1838	-.0670	-.1210	-.0673	-.0083	.0992	-.0767	.0256	.0190	-.0191	.0022	-.0000
Leadership	.0121	-.0870	.0186	.1383	.1078	-.0624	-.0939	-.0430	-.0061	-.0198	.0305	.0073	-.0173
Computational	.3048	.0186	-.1478	.2049	.0754	-.0958	.0292	-.0248	.0255	-.0201	-.0230	-.0083	.0062
Health Service	-.0654	-.0643	.0634	-.1772	.0745	.0042	-.0103	-.0018	-.0237	-.0542	-.0137	-.0071	.0069
Scientific	.0715	.2069	.0189	.0758	-.1293	.0716	.0905	.0204	-.0176	-.0076	.0200	.0258	-.0081
Electronic	-.2250	.2087	-.3304	-.1812	.0970	.0201	-.0540	-.0352	-.0104	.0142	.0058	.0050	.0038
Mechanics	-.2171	-.1216	.1771	.2901	-.0896	.0676	-.0076	.0105	-.0184	-.0201	-.0195	-.0140	-.0028
Clerical	-.0648	-.2872	-.1034	-.1137	-.1103	.0786	-.0157	.0970	-.0236	.0110	-.0019	.0113	.0013
Outdoors	.0318	.0951	.0713	.0216	-.0144	-.1305	-.0711	.0557	.0055	-.0017	.0047	.0179	.0070
Academic	.1773	.0493	.0294	-.0772	-.0197	-.0125	-.0998	-.0316	-.0041	.0194	-.0433	-.0003	-.0045

Table A21

Group Centroids for Discriminant Analysis Using
A Priori Scales as Independent Variables

SATISFIED

Group	First Function	Second Function	Third Function	Fourth Function	Fifth Function	Sixth Function	Seventh Function	Eighth Function	Ninth Function	Tenth Function	Eleventh Function	Twelfth Function	Thirteenth Function
Weather Observer	-.3910	-.3374	-.1393	-.0563	8613	-.1419	-.4280	.2056	.4501	-.2730	-.1743	-.0132	.1731
Radio Relay Repairman	.1051	-.6820	.7257	-.0345	-.0763	-.0167	.0533	.3806	.4742	.4504	-.1468	.2155	.0530
Ground Equipment Repairman	.3417	-.0321	.4402	-.0300	.1060	.0057	.6440	.3272	-.3811	-.6585	-.0045	.4926	-.6748
Aircraft Maintenance	.3855	.0888	-.1169	-.2404	.4000	.4997	.2073	.0746	-.4502	.1300	-.8516	-.5030	.3459
Vehicle Repairman	.5890	.2347	-.2964	-.6659	-.0950	-.2524	.1948	.1170	.5566	.2297	.5614	-.2163	.2194
Accounting Specialist	-.7089	.4391	.4346	-.6536	.0116	.2370	-.1939	-.3466	.0473	.1695	-.0292	-.0835	-.4682
Administration Specialist	-.2223	.6269	.2241	.3637	.2127	-.9353	.5194	-.1210	-.0289	.3276	-.2199	-.0241	.2678
Security Specialist	.0261	.5126	.0082	.5549	.3086	.1814	-.7487	.4624	-.5513	-.3063	.8429	.3465	.3884

DISSATISFIED

Group	First Function	Second Function	Third Function	Fourth Function	Fifth Function	Sixth Function	Seventh Function	Eighth Function	Ninth Function	Tenth Function	Eleventh Function	Twelfth Function	Thirteenth Function
Weather Observer	-.4679	-.5531	-.7628	.1245	.0162	-.2017	.3183	.0550	-.2816	.4223	.0868	-.0363	-.4678
Radio Relay Repairman	-.0065	-.5757	.2009	-.0403	-.2497	-.3210	.0031	-.9360	-.1289	-.6453	.0678	-.2551	.3935
Ground Equipment Repairman	.0906	-.2117	.3632	.2255	-.2861	.0551	-.3461	.0965	-.4817	.5043	.3085	-.6435	-.0700
Aircraft Maintenance	.2567	-.0402	-.2219	-.0188	.1470	.4393	.0093	-.7164	-.0516	.5219	.0649	.8893	.1718
Vehicle Repairman	.4442	.0525	-.3942	-.3620	-.2363	-.4461	-.5644	.0565	-.0167	-.2439	-.3102	-.0389	-.5893
Accounting Specialist	-.5688	-.0199	-.2268	-.3333	-.5402	.3401	.4398	.4408	-.0170	-.3077	.1110	.0261	.5457
Administration Specialist	-.0847	.2284	-.1531	.4709	-.7569	.0511	-.3421	.0723	.3831	-.0172	-.6584	.2252	.0382
Security Specialist	.2112	.2691	-.0855	.6956	.1771	.5057	.2339	-.1685	.4777	-.3038	.3516	-.3813	-.3667

Table A22

Discriminant Function Weights for Eight Occupational Scales

Scale	First Function	Second Function	Third Function	Fourth Function	Fifth Function	Sixth Function	Seventh Function	Eighth Function
Weather Observer	-.0996	-.1441	.0426	.2512	-.0669	-.0423	-.0676	.0366
Radio Relay Repairman	-.0105	-.3378	.0556	-.1717	.0933	.0473	-.0126	.0207
Ground Equipment Repairman	.1273	-.0145	.0142	-.0724	-.1711	-.1260	.0116	-.0483
Aircraft Maintenance	-.0720	.0369	-.0194	.0363	-.0033	.1535	.1532	-.0230
Vehicle Repairman	.2791	.0371	-.2329	.0954	.0481	-.0543	-.0807	.0818
Accounting Specialist	-.2857	.0146	-.2851	-.0148	.0456	-.0531	.0612	-.0288
Administration Specialist	-.0775	.2009	.0314	-.1554	-.0803	.0618	-.0217	.0596
Security Specialist	.0319	-.0299	.1580	.0445	.0964	.0850	.0632	.0257

Table A23

Group Centroids for Discriminant Analysis Using Occupational Scales as Independent Variables

SATISFIED

Group	First Function	Second Function	Third Function	Fourth Function	Fifth Function	Sixth Function	Seventh Function	Eighth Function
Weather Observer	-0.4136	-0.3862	0.2902	0.7417	-0.6323	0.1448	-0.4067	0.1714
Radio Relay Repairman	0.0074	-0.7551	-0.0122	-0.5403	0.1017	0.6929	-0.0878	0.0134
Ground Equipment Repairman	0.3666	-0.0776	-0.0088	-0.3130	-1.0054	-0.5651	-0.2087	-0.2322
Aircraft Maintenance	0.3117	-0.0031	-0.1102	0.4507	-0.2038	0.7126	0.6382	-0.5610
Vehicle Repairman	0.6701	0.2489	-0.5725	0.2342	0.1103	0.0600	-0.4924	0.3367
Accounting Specialist	-0.7668	0.3043	-0.8068	-0.1530	-0.2000	0.0845	0.1223	-0.2344
Administration Specialist	-0.2530	0.6766	0.3802	-0.3468	-0.0881	0.5897	-0.2672	0.7858
Security Specialist	0.0030	0.5006	0.7870	0.3820	0.6137	-0.5009	0.3364	-0.2264

DISSATISFIED

Group	First Function	Second Function	Third Function	Fourth Function	Fifth Function	Sixth Function	Seventh Function	Eighth Function
Weather Observer	-0.3175	-0.4387	0.0956	0.4384	0.4006	-0.1913	-0.1445	0.1098
Radio Relay Repairman	0.0011	-0.5854	-0.0278	-0.3928	0.3789	-0.1831	-0.0459	0.0560
Ground Equipment Repairman	0.0903	-0.1360	0.0845	-0.4515	-0.2440	-0.4281	0.2782	0.1740
Aircraft Maintenance	0.2833	0.0041	-0.1521	0.1722	-0.0748	-0.1760	0.5625	0.5443
Vehicle Repairman	0.4480	0.0833	-0.4052	0.1592	0.3899	0.0603	-0.4121	-0.1643
Accounting Specialist	-0.5071	-0.0055	-0.3698	0.0162	0.2547	-0.3132	0.1561	0.1031
Administration Specialist	-0.0953	0.3215	0.3568	-0.2725	0.1224	0.0022	-0.5626	-0.7950
Security Specialist	0.1718	0.2483	0.4711	-0.1247	-0.0762	0.0107	0.5342	0.0811